Tutorial Letter 101/3/2013

Computer Systems: Fundamental Concepts

COS1521

Semesters 1 and 2

School of Computing

IMPORTANT INFORMATION:

This tutorial letter contains important information about your module.

BAR CODE

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Please note / important notes:

This is a **semester** module. To be considered for examination in this module, you must meet the following requirement:

Semester 1: Submit Assignment 01 by 13 March 2013.

Semester 2: Submit Assignment 01 by 28 August 2013.

Your semester mark and examination mark will determine your final mark.

Your semester mark will be based on the percentages you achieve for Assignments 01 and 02.

1 INTRODUCTION AND WELCOME

Dear Student

Welcome to Computer Systems: Fundamental Concepts (COS1521). This is a semester module that is presented by the School of Computing.

This module provides you with a background on computers. In modern society, computers already play such a major role in our daily lives that we accept their use as a matter of course. In COS1521 you are introduced to number systems, data storage and operations on data. Furthermore, the basics of logic gates and Boolean algebra will eventually help you to draw simple combinational logic circuits when given a problem statement. The fundamentals of sequential logic circuits are also investigated. You become better acquainted with numerous concepts and properties of the hardware and software components of computer systems. The concept of software engineering is explained. Concepts relating to data structures, databases and database management are introduced. We also look at the role that computers play in data communication in the modern world.

If you put an honest effort into trying to do the self-assessment exercises and assignments, we believe you will achieve the outcomes of this module. We hope that this module will open up a whole new world for you. We bid you a hearty welcome and wish you everything of the best for your studies this semester.

Note: As from 2010, the tutorial matter for COS1521 is only available in English.

1.1 *TUTORIAL MATTER*

The content of the module is included in the following tutorial matter:

- Tutorial Letters 101 and 102
- Tutorial Letters 201 and 202
- Textbook
- CAI tutorial available on the school's CD software (optional)

Some of the tutorial matter might not be available when you register. Tutorial matter that is not available when you register will be posted to you as soon as possible, but is also available on myUnisa. Note that Unisa highly encourages the use of technology in teaching and learning. You are therefore encouraged to make regular use of myUnisa to get access to study materials. You must be registered on myUnisa to be able to submit assignments, to have access to the Library functions, to download study material and to participate in online discussion forums with lecturers or fellow students.

2 PURPOSE OF, OUTCOMES FOR AND SYLLABUS OF THE MODULE

2.1 *PURPOSE*

COS1521 is one of a number of first-year Computer Science modules offered by the School of Computing at Unisa. The purpose of this module is to introduce students to the computer as a system. The module covers hardware concepts such as internal representation of numbers and characters and basic computer architecture, and software concepts such as systems software and applications software. It also includes a brief introduction to databases, and to systems analysis and design.

2.2 *OUTCOMES*

A range of tasks (in study guides, tutorial letters, assignments and examinations) will show that students have achieved the following outcomes, namely to:

Specific outcome 1
Demonstrate how data are represented, manipulated and stored in a computer using number systems, Boolean algebra, Karnaugh maps, truth tables and basic logic circuits drawings, in the context of given problem statements.

Range:
Basic knowledge of internal data, logic gates, and memory elements will be demonstrated only in the context of the design of basic combinational and sequential logic circuits.

Assessment criteria:
1.1 Conversions between different number systems (binary, octal, decimal and hexadecimal);
1.2 The application of different arithmetic methods in the binary number system;
1.3 The identification of computer data includes the different internal representations;
1.4 Explanations include the basic restrictions placed by computer architecture upon numerical computations;
1.5 The determination of outputs of basic combinational logic circuits for given inputs;
1.6 Graphical representations of the combinational circuits for given Boolean functions;
1.7 The simplifications of Boolean functions by implementing appropriate rules/methods;
1.8 The determination of a Boolean function for a given problem statement using truth tables (at most 4 variables);
1.9 Boolean expressions and binary logic that describe the behaviour of logic circuits;
1.10 The descriptions of the functioning of different types of combinational and sequential logic circuits.

Specific outcome 2
Demonstrate an understanding of the basic functions of computers, the software development process and units of hardware and software components.

Range:
The context is basic computer hardware and systems software with its relevant algorithms.

Assessment criteria:
2.1 Today's computers are described in context of some short historical background, different architectures and ethical scenarios/issues;
2.2 Descriptions of software engineering and operating systems include the development of software in a historical context;
2.3 The description of a basic computer includes the three basic hardware subsystems and their interconnecting functioning;
2.4 The description of an operating system includes the functioning of its components;
2.5 The descriptions of popular operating systems with references to different popular operating platforms;
2.6 The definition of an algorithm includes its relation to problem solving;
2.7 Definitions of the three algorithm constructs include descriptions of their use in algorithms;
2.8 Descriptions of basic algorithms include their applications;
2.9 Descriptions of the sorting and searching concepts of algorithms include an understanding of their mechanisms;
2.10 Descriptions of sub-algorithms include their relations to algorithms;
2.11 Descriptions of the development process models in software engineering include the concepts of the software life-cycle phases and documentation.

Specific outcome 3
Demonstrate an understanding of the basics of data communications and networks.

Range:
The context is the basics of Information Communication Technologies.

Assessment criteria:
3.1 Descriptions of physical structures of networks include references to network criteria, physical structures and categories of networks;
3.2 The description of the internet includes the TCP/IP protocol suite with reference to the characteristics of its layers and their relationships;
3.3 Descriptions of internet applications in the context of client-server communications.

Specific outcome 4
Describe data structures and how different databases function.

Range:
The contexts are typical of the demands of first-year undergraduate study.

Assessment criteria:
4.1 Descriptions of data structures include references to the differentiation between different structures;
4.2 Descriptions of file structures include references to updating and access methods, and categories of directories and of files;
4.3 Definitions of a database and some traditional database models include the relational database design;
4.4 The definition of a database management system (DBMS) includes its architecture;
4.5 Descriptions include the steps in database design.

2.3 *SYLLABUS*

The module content is covered by Chapters 1 to 11, 13 & 14 of the prescribed text book, referred to as F&M, provided in Section 4.1 and all the tutorial letters, including Tutorial Letter 102. The excluded sections of the prescribed book are: 2.3, 5.6, 5.7, 8.7, 9.4 and14.7.

The following topics are covered in the prescribed book:

Chapter 1: Introduction

Chapter 2: Number systems

Chapter 3: Data storage; (Appendix A: ASCII and Unicode)

Chapter 4: Operations on data;

Appendix E: Boolean algebra and logic circuits.

Chapter 5: Computer organization

Chapter 6: Computer networks

Chapter 7: Operating systems

Chapter 8: Algorithms

Chapter 9: Programming languages

Chapter 10: Software engineering

Chapter 11: Data structures

Chapter 13: File structures

Chapter 14: Databases

Tutorial Letter 102 contains information on the study material in the prescribed book (certain sections are excluded from the prescribed chapters), a summary, learning

outcomes and explanatory notes for Appendix E, additional exercises, and errata for F&M. In addition it contains the solution to the self-assessment assignment.

Very Important: *You must make use of Tutorial Letter 102* ***before*** *you complete the Self-assessment assignment and Assignment 01 especially Units 1 to 4 and pages 24 to end. These pages will help you to understand the textbook content better in order for you to answer the questions in Assignment 01.* ***Please read Tutorial Letter 102*** *from day 1. It is available on myUnisa in case you have not received the printed copy.*

A **summary** and list of **key terms** are provided at the end of each chapter of the textbook. These are very useful for identifying the most important concepts covered in the relevant chapter.

In the School of Computing all students must have access to the internet, but no references to interactive work (working on the computer or searches on the internet) are obligatory.

3 LECTURERS AND CONTACT DETAILS

3.1 *LECTURERS*

The best means to contact your lecturers is by email. The email address to use for Semester 1 is COS1521-13-S1@unisa.ac.za and for Semester 2 is COS1521-13-S2@unisa.ac.za

You can find the names of your lecturers, their contact details (including emails) and School of Computing contact information on myUnisa in Tutorial Letter COSALLF for 2013.

You can also obtain lecturers' and school's contact information on http://osprey.unisa.ac.za.

The COS1521 discussion forum on myUnisa gives you the opportunity to discuss ideas and problems with fellow students. This forum is for the benefit of the students and the lecturers do not necessarily play an active part in the discussions. You can post queries regarding this module on the COS1521 discussion forum.

You are more than welcome to phone us, but please consult your tutorial letters or the relevant web sites first to see whether we have not already addressed your queries. Since most students encounter the same problems, we address the most common problems in the tutorial letters or web sites.

Remember, you may phone the lecturers directly. However, sometimes we are not available due to other School or University duties. The names and telephone numbers of the lecturers will be given in COSALLF tutorial letter that you will receive early in the semester. Should you have difficulty in contacting the lecturers, you are welcome to phone the secretary of the School of Computing at (012) 429-6122 to leave a message. Note that this number may change during the course of 2013. Look out for the new contact details of the School of Computing.

Note that in respect of **all administrative enquiries such as registrations, fees, assignment submission, examination matters such as aegrotat and special exams,** the contact details are provided in the *my Studies @ Unisa brochure* or on the Unisa website.

3.2 *DEPARTMENT*

See the information in Section 3.1

3.3 *UNIVERSITY*

You will find general Unisa contact details in the *my Studies @ Unisa* brochure or on the Unisa website. Please remember to use your student number when contacting the University. See more information in Section 3.1.

If you need to contact the university about administrative matters, you should send your queries via e-mail to the specific department whose contact details are provided in the brochure *my Studies @ Unisa* that you received in your study package. This brochure also contains other important information about Unisa.

4 MODULE RELATED RESOURCES

4.1 *PRESCRIBED BOOKS*

The prescribed book for this module is:

Forouzan, Behrouz & Mosharraf, Firouz. *Foundations of Computer Science*, 2nd edition. Cengage Learning (Thomson Learning), 2008. ISBN: 978-1-84480-700-0.

As stated before, we refer to the prescribed book as F&M throughout this tutorial letter.

Tutorial Letter 102 contains notes on the study material in the prescribed book and also contains **supplementary study material**. **Please read Tutorial Letter 102** from day 1. See section 2.3 for more information about 102.

The prescribed book is **not** included with your study material. To obtain a copy of the prescribed book, please refer to the list of official booksellers and their addresses in the *my Studies @ Unisa* brochure.

Prescribed books can be obtained from the University's official booksellers. If you have difficulty in locating your book at these booksellers, please contact the Prescribed Book Section at Tel: 012 429-4152 or e-mail vospresc@unisa.ac.za.

4.2 *RECOMMENDED BOOKS*

Should you wish to know more about a particular topic, you may consult any of the following books: (Please note that these books are not necessarily included in the Study Collection in the Unisa library. The library cannot guarantee that they will be available, nor draw up waiting lists for them.) Exams and assignments will be based on the prescribed textbook and the content of Tutorial Letter 102.

CLEMENTS A. *The principles of computer hardware*, 3rd edition. Oxford University Press, Oxford, 2000.

O'BRIEN J.A. *Introduction to information systems*, 8th edition. Irwin Homewood, Burr Ridge Illinois, 1996.

HUTCHINSON S.E. and SAWYER S.C. *Computers, Communications & Information. A user's Introduction*, 7th edition. Irwin McGraw-Hill, Boston, 2000.

MARCOVITZ A.B. *Introduction to logic design*. McGraw-Hill Higher Education, Avenue of the Americas, New York, NY10020, 2002.

WILLIAMS B. K. and SAWYER S.C. Using Information Technology.A practical introduction to computers & communications, 5th edition. Irwin McGraw-Hill, Boston, 2003.

CAPRON H. L. and JOHNSON J.A. *Computers. Tools for an information age*, 7th edition. Prentice Hall, Upper Saddle River, New Jersey, 07458, 2002.

SHELLY G. and VERMAAT M.E. *Discovering computers 2010.Living in a digital world.* Course Technology, 20 Channel Center Street, Boston, MA 02210, USA, 2010.

4.3 *ELECTRONIC RESERVES (E-RESERVES)*

There are no e-Reserves for this module.

4.4 *E-LEARNING TUTORIAL*

There is an optional CAI-lesson namely *Karnaugh* available that we highly recommend.. It is available on the school's software CD. It deals with the simplification of Boolean expressions by means of *Karnaugh* maps (diagrams) and includes background material. This material is covered in Assignment 01 and the lesson can also help with examination preparation on this topic. The lesson is highly recommended by past students. If you do not get access to this CD, check on COS1521 home page on information of how to get it.

5 STUDENT SUPPORT SERVICES FOR THE MODULE

Important information appears in the *my Studies @ Unisa* brochure. For example, the tutorial services information is found in this brochure. Please constantly refer to this brochure. This module is part of a science foundation programme (SFP). For students who are not part of SFP, e-tutoring support may be provided. Check the *my Studies @ Unisa* brochure for more information or enquire at your nearest Unisa study centre.

SCIENCE FOUNDATION PROGRAMME

5.1 *WHAT IS FOUNDATION PROVISION?*

Foundation provision is an extended additional teaching and learning intervention whose primary purpose is that of improving the success and graduation rate of identified "at-risk" students. Because Unisa is a higher education distance-learning institution, the extended additional teaching and learning intervention will include:

- the appointment of science-specific tutors to assist the "at-risk" student
- supporting "at-risk" students with academic learning gaps
- arranging peer-collaborative learning opportunities with fellow students on regional level.

5.2 *WHAT IS THE SCIENCE FOUNDATION PROGRAMME?*

The SFP runs concurrently with normal science teaching and learning activities. It creates more opportunities for students to be exposed to the learning content and activities. The extended additional teaching and learning intervention is limited to science students who register in the College of Science, Engineering and Technology and the College of Agriculture and Environmental Sciences in their first year. The foundation provision is available for students registered for COS1521.

5.3 *WHO CAN PARTICIPATE IN THE SFP?*

All new science students to Unisa adhering to specific SFP admission criteria are allowed into the SFP. Selection criteria that will identify "at-risk" students are determined taking into account the student's M-count total; marks in school Mathematics, Physical sciences (and/or Biology, Physiology, etc.) and language subjects. A post-registration diagnostic test will further inform "at-risk" student of any academic literacy gaps. More information will be sent to you at a later stage.

5.4 *HOW DOES A STUDENT GAIN ADMISSION TO THE SFP?*

Once a student has been identified as "at risk", she/he will automatically qualify for the SFP. Consult the *my studies @ Unisa* brochure for more information. An e-tutoring system might be used. These interventions will be provided at no additional cost.

5.5 *WILL PARTICIPATION IN THE SFP PROVE TO BE SUCCESSFUL?*

Given the extended and additional learning opportunities created by the SFP it is envisaged that the success rate of "at-risk' students will be increased. Much of the success will be determined by the student's willingness to spend additional time and effort to attend the tutoring classes, academic literacy sessions and peer-collaborative learning opportunities.

6 MODULE SPECIFIC STUDY PLAN

Use the *my Studies @ Unisa* brochure for general time management and planning skills.

FIRST SEMESTER STUDY PROGRAMME

Week	Date (Mondays)	Activities	Tutorial matter
1	28 January		F&M, Chapters 1 & 2 Tutorial Letter 102, Units 1 & 2, & Part II
2	4 February	Start Assignment 01	F&M, Chapters 3 & 4; Appendix A Tutorial Letter 102, Units 3 & 4, & Part II
3	11 February	Do Self-assessment (Section A) by 15/02/13. **(Do not submit.)**	F&M, Chapters 1 – 4; Appendix A Tutorial Letter 102, Units 1 – 4 & Part II
4	18 February		F&M, Chapter 4; Appendix E Tutorial Letter 102, Unit 4 & Part II
5	25 February	Do Self-assessment (Section B) by 01/03/13. **(Do not submit.)**	F&M, Chapter 4; Appendix E Tutorial Letter 102, Unit 4 & Part II
6	4 March		F&M, Appendix A & E Tutorial Letter 102, Units 1 – 4 & Part II & III
7	11 March	**Complete Assignment 01 (Due date: 13 March)**	F&M, Appendix A & E Tutorial Letter 102, Units 1 – 4 & Part II & III
8	18 March	Start Assignment 02	F&M, Chapters 5 & 6 Tutorial Letter 102, Units 5 & 6
9	25 March		F&M, Chapters 7, 8 & 9 Tutorial Letter 102, Units 7, 8 & 9
10	1 April		F&M, Chapters 10 & 11 Tutorial Letter 102, Units 10 & 11
11	8 April		F&M, Chapters 13 & 14 Tutorial Letter 102, Units 13 & 14
12	15 April	**Complete Assignment 02 (Due date: 16 April)**	F&M, Chapters 5 – 14 Tutorial Letter 102, Units 5 – 14
13 - 15	22 Apr. up to examination date	Revision	
		Examinations	

SECOND SEMESTER STUDY PROGRAMME

Week	Date (Mondays)	Activities	Tutorial matter
1	15 July		F&M, Chapters 1 & 2 Tutorial Letter 102, Units 1 & 2, & Part II
2	22 July	Start Assignment 01	F&M, Chapters 3 & 4; Appendix A Tutorial Letter 102, Units 3 & 4, & Part II
3	29 July	Do Self-assessment (Section A) by 02/08/13. **(Do not submit.)**	F&M, Chapters 1 – 4; Appendix A Tutorial Letter 102, Units 1 – 4 & Part II
4	5 August		F&M, Chapter 4; Appendix E Tutorial Letter 102, Unit 4 & Part II
5	12 August	Do Self-assessment (Section B) by 16/08/13. **(Do not submit.)**	F&M, Chapter 4; Appendix E Tutorial Letter 102, Unit 4 & Part II
6	19 August		F&M, Appendix A & E Tutorial Letter 102, Units 1 – 4 & Part II & III
7	26 August	**Complete Assignment 01 (Due date: 28 August)**	F&M, Appendix A & E Tutorial Letter 102, Units 1 – 4 & Part II & III
8	2 September	Start Assignment 02	F&M, Chapters 5 & 6 Tutorial Letter 102, Units 5 & 6
9	9 September		F&M, Chapters 7, 8 & 9 Tutorial Letter 102, Units 7, 8 & 9
10	16 September		F&M, Chapters 10 & 11 Tutorial Letter 102, Units 10 & 11
11	23 September		F&M, Chapters 13 & 14 Tutorial Letter 102, Units 13 & 14
12	30 September	**Complete Assignment 02 (Due date: 1 October)**	F&M, Chapters 5 – 14 Tutorial Letter 102, Units 5 – 14
13 - 15	7 Oct. up to examination date	Revision	
		Examinations	

7 MODULE PRACTICAL WORK AND WORK INTEGRATED LEARNING

None.

8 ASSESSMENT

We realise that it might be difficult to keep to given schedules, but once assignment dates are set, they are captured by the Unisa system and cannot be changed by anyone, including the lecturer. We, therefore, have to adhere to these dates. Please do not contact us for extension of assignments submissions.

In the School of Computing all students must have access to the internet. Study material can therefore be downloaded if for some reason there is a delay in the sending of tutorial matter. The following URL can be accessed if you want to download tutorial matter: https://my.unisa.ac.za

8.1 *ASSESSMENT PLAN*

NO ASSIGNMENTS WILL BE ACCEPTED AFTER THE EXTENSION DATES.

There are three assignments:

The Self-assessment assignment should **not** to be submitted.

Assignments to be submitted:
Assignment 01: A multiple-choice assignment that will be marked electronically.
Assignment 02: A multiple-choice assignment that will be marked electronically.

All multiple-choice assignments are marked electronically by the Assignments section of the directorate of student assessment and administration (DSAA). This means that there is a specific date by which they feed all the submitted mark-reading sheets to the computer (batch processing). For this procedure to be successful, **no multiple-choice assignment received after the due date will be accepted**. You are highly encouraged to submit the assignment via myUnisa.

Self-assessment assignment
The self-assessment assignment is for both the first and the second semester. **Do not submit this assignment.** You will receive a model solution for this assignment in Tutorial Letter 102 early in the semester.

You will get a ***semester mark*** based on the percentages you achieve for Assignments 01 and 02. The semester mark will contribute 10% towards your final mark for this module. A semester mark does not contribute to the result of a student writing a supplementary examination. It will contribute in the case of an aegrotat examination. A discussion of the way in which the semester mark is calculated, follows.

According to the assessment policy of the University, the School of Computing uses a semester mark to contribute to your final mark for COS1521. The semester mark will count 10% towards your final mark. Assignment 01 has a weight of 40% towards the

year mark and Assignment 02 has a weight of 60%. No weight is assigned to the Self-assessment assignment. We use an example to explain.

Suppose you obtained the following marks for your assignments:
Assignment 01 70%
Assignment 02 90%

Your semester mark will be calculated as follows:

(70 × 0.4)+(90 × 0.6)% = 82%, where 0.4 (40%) and 0.6 (60%) are the weights associated with Assignment 01 and 02 respectively.

Suppose you achieve an ***exam mark*** of 74%. Your ***final mark*** will be calculated as follows:
(82 × 0.10) + (74 × 0.90)% = (8.2 + 66.6)% = 74.8% that will be rounded to 75%.

Due dates are given for Assignments 01 and 02. Please do not contact us for further extension. Please note that it is your responsibility to make sure that your assignments is received by the University. Also make sure that your marks for Assignments 01 and 02 are incorporated in your semester mark before you write the examination. **Note that the fastest and most secure way to submit your MCQ assignment is via myUnisa.** We advise that you use this method to submit both assignments.

Note that if myUnisa is down on the last submission date, the DSAA and lecturers will be notified. Try to resubmit the assignment as soon as myUnisa is running again. Please do not contact lecturers if any of these problems occur since any problem situation shall be taken into consideration. Queries with regard to submission of assignments should be directed to the Assignment section of DSAA.

8.2 *GENERAL ASSIGNMENT NUMBERS*

8.2.1 UNIQUE ASSIGNMENT NUMBERS

Semester 1	
Assignment	**Unique assignment number**
01	**227606**
02	**361660**
Semester 2	
Assignment	**Unique assignment number**
01	**214385**
02	**277130**

8.2.2 DUE DATES OF ASSIGNMENTS

Self-assessment assignment for First and second semester		
Semester	Finish by	Weight towards semester mark
01	Part A: 15 Feb Part B: 1 March	- -
02	Part A: 02 Aug Part B: 18 Aug	- -
First semester		
Assignment	Due date	Weight towards semester mark
01	13 March	40%
02	16 April	60%
Second semester		
Assignment	Due date	Weight towards semester mark
01	28 August	40%
02	1 October	60%

8.3 *SUBMISSION OF ASSIGNMENTS*

We **recommend** that you submit both assignments via myUnisa.

For detailed information on assignments, please refer to the *my Studies @ Unisa* brochure, which you received with your study package.

To submit an assignment via *my*Unisa:

- Go to *my*Unisa.
- Log in with your student number and password.
- Select the module.
- Click on assignments in the menu on the left-hand side of the screen.
- Click on the assignment number you wish to submit.
- Follow the instructions.

Assignments may not be submitted by fax or e-mail.

Note: Administrative enquiries about assignments should be addressed to an email provided in the my Studies @ Unisa brochure.

8.4 *ASSIGNMENTS TO BE DONE*

There are three assignments:

The **Self-assessment assignment** is NOT to be submitted but must be attempted.

Assignments 01 and 02 are to be submitted. See all the assignments in Section 12 of this tutorial letter.

9 EXAMINATIONS

FIRST SEMESTER: **In order to be considered for the** first semester examination admission **in COS1521, a student** must submit Assignment 01 by 13 March 2013.

SECOND SEMESTER: **In order to be considered for the** second semester examination admission **in COS1521, a student** must submit Assignment 01 by 28 August 2013.

There will be a two hour examination at the end of the semester. The format of the exam and its scope will be sent to you during the semester. Supplementary exams will be done at the end the semester following the semester in which you sat for the exam. This is also the case with aegrotat examination. Please do not contact the lecturer for supplementary or aegrotat exams, rather refer to the *my Studies @ Unisa* brochure for guidelines. Read the *my Studies @ Unisa* brochure for general examination guidelines and examination preparation guidelines.

The assignments and the examination letter that will be provided to you contain enough examples of the type of questions that you can expect in the examination. We therefore request you not to contact the lecturers of this module for past paper examination papers, if there are none on myUnisa. The lecturers to not provide solutions to the past exam papers on myUnisa.

Note that the examination mark contributes 90% towards your final mark and the semester mark contributes the other 10%. See Section 8.1 for a calculation of the final mark. If you fail the examination with less than 40%, the year mark will **not** count to pass you.

Note to supplementary students: Please ensure that you download all relevant study material, such as the Exam tutorial letter, from myUnisa before the end of the semester in which you are registered for they will not be available after the end of the semester.

Note: Examination related enquiries should be addressed to an email provided in the *my Studies @ Unisa* brochure.

10 OTHER ASSESSMENT METHODS

There are no other assessment methods for this module.

11 FREQUENTLY ASKED QUESTIONS

The *my Studies @ Unisa* brochure contains an A-Z guide of the most relevant study information. Please refer to this brochure.

12 ASSIGNMENTS

12.1 SELF-ASSESSMENTASSIGNMENT FOR FIRST AND SECOND SEMESTER

(Attempt this assignment before Assignment 01)

This assignment consists of Sections A and B

It is strongly advised that you attempt **both** sections A and B of this assignment before you do Assignment 01.

Completion date: Section A: 15/02/13; Section B: 01/03/13 (First semester)
Section A: 02/08/13; Section B: 16/08/13 (First semester)

Semester-mark weight: None

The solution to this assignment is provided in Tutorial letter 102. Compare your answers to those in the letter. If you have not received a printed copy of this letter, download it from https://my.unisa.ac.za

DO NOT SUBMIT

12.1.1 SECTION A – SELF ASSESSMENT

Study material: (1) F&M: Chapters 1 – 4; Appendix A

(2) Tutorial Letter 102: Part I: Units 1 – 4

DO NOT SUBMIT

Question 1

Provide a detailed answer to each of the following questions:

(a) List the four subsystems comprising a machine based on the von Neumann model.
(b) What does the concept ‘a stored program’ mean?
(c) What are the two important aspects of programming that must be understood when we consider the von Neumann model?
(d) Why does it make sense that data and program instructions have the same format?
(e) What is a computer program?
(f) Describe in your own words what an algorithm is.
(g) What is meant by the term ‘software engineering’ as defined in the context of the textbook?

(h) List some of the main functions of an operating system.

(i) Compare and contrast the memory contents of early computers with the memory contents of a computer based on the von Neumann model.

(j) According to the von Neumann model, can the hard disks of today be used as input or output device? Explain.

Question 2

Convert the following numbers to decimal:

(a) $(10101.1)_2$

(b) $(1010011.01)_2$

(c) $(517)_8$

(d) $(710.01)_8$

(e) $(A9F)_{16}$

(f) $(B08.4)_{16}$

Question 3

Convert the following decimal numbers to binary, octal and hexadecimal:

(a) 613.625 (b) 120.25

Question 4

Why is 845,3 not an octal number?

Question 5

Do the following binary arithmetic:

(a) 10111 + 1111 (b) 110100 - 10011

Question 6

What are the disadvantages of the sign-and-magnitude representation?

Question 7

Write down the following numbers in binary, normalised floating-point representation:

(a) 78.43 (b) 1.39×10^2

Question 8

What is the result if a logical right-shift operation is applied to the bit pattern 11001111?

Question 9

Using an 8-bit allocation, use two's complement arithmetic to determine -15 + 12.

12.1.2 SECTION B – SELF ASSESSMENT

Study material: (1) F & M: Chapter 4; Appendix E

(2) Tutorial Letter 102: Parts 1 an II Unit 4

Do the relevant exercises in F&M and Tutorial Letter 102 before attempting this section.

DO NOT SUBMIT

WRITTEN QUESTIONS

Question 1 **[4]**

(a) Use the XOR operator on the bit patterns 100110101 and 101010011. (Determine 100110101 XOR 101010011.)

(b) Determine 1101101 + 1000110 in binary.

(c) A 6-bit digital counter can be made up of _____ T flip-flops. At the start the counter represents _____.

Question 2 **[4]**

Draw the logic circuit for the following Boolean expression (do not simplify the expression):

$F(x, y, w) = [(x' + y + w) + xy]' \oplus w'$

(The circuit should include one OR gate, one AND gate, one NOR gate, one XOR gate and two inverters. Draw all the gates clearly.)

Question 3 **[8]**

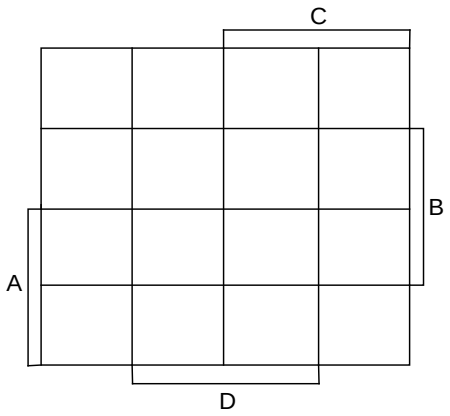
Use only Boolean algebra to simplify the Boolean expression F. (First determine F_1 and F_2, then simplify $F_1 + F_2$, showing all the steps. You need not provide the names of the Boolean rules that you apply.)

$F_1 = x'(wy')' + x'wy'$
$F_2 = (xw + w')'$
$F(w, x, y) = F_1 + F_2$.

Question 4 **[5]**

Use a *Karnaugh* map to find the simplest form of
H(A, B, C, D)) = $m_0 + m_1 + m_2 + m_3 + m_5 + m_6 + m_8 + m_9 + m_{13}$.

Derive the terms of H directly from the *Karnaugh* map without making use of algebraic manipulations or truth tables. Clearly show the groupings.
Use exactly the same order for the variables as given in the following diagram:



Question 5 **[9]**

Four types of package (A, B, C and D) with chemicals are supplied to research laboratories. Each package contains unique types of chemicals.
Package A contains 3 different types of chemicals,
Package B contains 6 different types of chemicals,
Package C contains 5 different types of chemicals and
Package D contains 2 different types of chemicals.

Suppose the input variables A, B, C and D in a truth table take on the value 1 whenever a laboratory receives a package with chemicals. For example, if A = 0, B = 1, C = 0 and D = 1, it means that a laboratory receives packages B and D.

Construct a truth table (use the same order for the variables as in the table given on the next page) to determine the Boolean function F(A, B, C, D) that gives a 1 whenever a laboratory receives more than 11 different types of chemicals.

Give F as a sum-of-minterms in m-notation.

A	B	C	D	F	minterms
0	0	0	0		
0	0	0	1		
0	0	1	0		
0	0	1	1		
0	1	0	0		
0	1	0	1		
0	1	1	0		
0	1	1	1		
1	0	0	0		
1	0	0	1		
1	0	1	0		
1	0	1	1		
1	1	0	0		
1	1	0	1		
1	1	1	0		
1	1	1	1		

MULTIPLE CHOICE QUESTIONS

Question 6

Which logic gate has an output of 1 only if it has two inputs that are not equal?

A. OR
B. XNOR
C. NAND
D. XOR

Question 7

How many adjacent minterms must be grouped together in a four variable *Karnaugh* map to derive a simplified term consisting of three variables?

A. 8
B. 4
C. 2
D. 1

Question 8

In which category of logic circuits does a flip-flop fall?

A. combinational circuits
B. sequential circuits
C. adders
D. multiplexers

Question 9

A three-bit digital counter counts from 0 to _____.

A. 16
B. 15
C. 8
D. 7

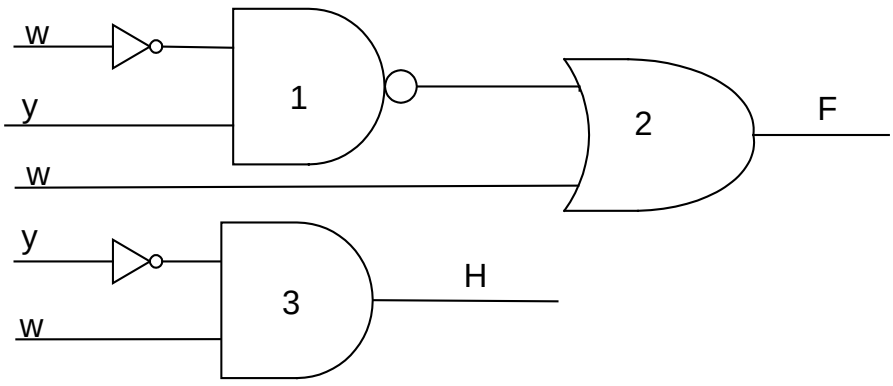
Question 10

Which one of the following statements best describes a multiplexer?

A. A combinational circuit that has *n* inputs and *n* outputs.
B. A combinational circuit that has *n* inputs and only 1 output.
C. A sequential circuit that has *n* inputs and *n* outputs.
D. A sequential circuit that has *n* inputs and *n* − 1 outputs.

Question 11

Consider the following two logic circuits:



These two logic circuits are not equivalent. The outputs are F = (w'·y)' + w and H = y'·w. One of the four gates must be changed in order for the circuits to become equivalent. Which gate must be changed and what kind of gate must it become?

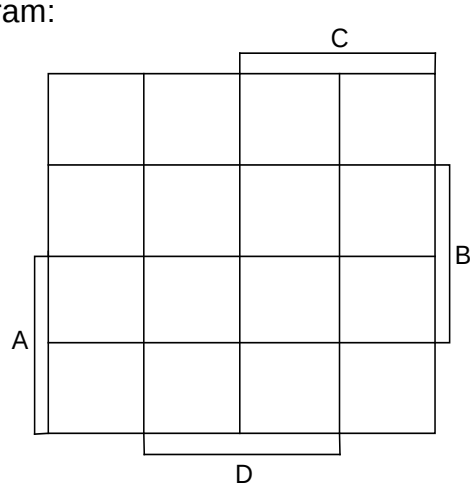
A. Gate 1 must change to a NOR gate.
B. Gate 1 must change to an OR gate.
C. Gate 3 must change to a NAND gate.
D. Gate 3 must change to an OR gate.

Question 12

Use a *Karnaugh* map to find the simplest form of the following sum-of-minterm expression:

$$F(A, B, C, D) = m_1 + m_6 + m_7 + m_9 + m_{10} + m_{14} + m_{15}$$

Derive the terms of F directly from the *Karnaugh* map without making use of algebraic manipulations or truth tables. Use exactly the same order for the variables as given in the following diagram:

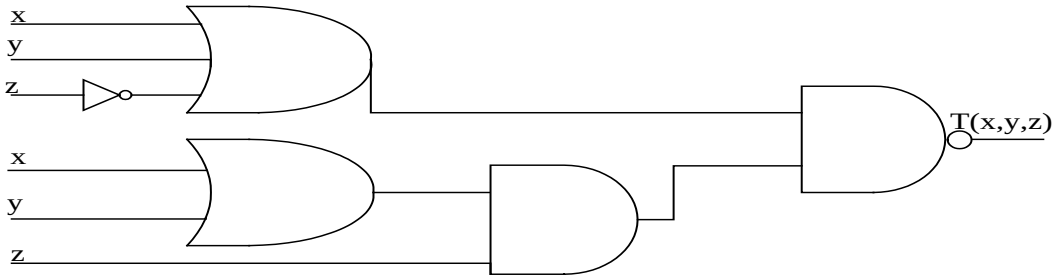


What is the simplified expression of F, derived directly from the *Karnaugh* map?

A. F = AB'CD' + B'C'D + BC
B. F = B'C'D + ACD' + BC
C. F = B'C'D + BCD + CD'
D. F = AB'C'D' + A'B'C'D' + ACD' + BC

Question 13

Consider the following logic circuit:



What is the final output T(x, y, z) of the given logic circuit?

A. T = (x + y + z')' + ((x + y)· z)'
B. T = [(x· y· z') **+** ((x· y) **+** z)]'
C. T = (x + y + z')' · ((x + y)· z)'
D. T = [(x + y + z') · ((x + y)· z)]'

Question 14

Consider the expression F = (xy')' ·**[**x'z**]** + (x'' + y').
If x = 1, y = 0 and z = 1, what are the values of (xy')'; **[**x'z**]**; (x'' + y') and F?

A. (xy')' = 0; **[**x'z**] = [**0**]**; (x'' + y') = (1) and F = 1
B. (xy')' = 0; **[**x'z**] = [**1**]**; (x'' + y') = (0) and F = 0
C. (xy')' = 1; **[**x'z**] = [**0**]**; (x'' + y') = (1) and F = 1
D. (xy')' = 1; **[**x'z**] = [**1**]**; (x'' + y') = (0) and F = 0

Question 15

Use only Boolean algebra to simplify the following Boolean expression: F(v, w, x) = vxw' + (vxw')'
What is the simplest form of F?

A. vxw' + v' + x' + w'
B. w'(vx + (vx)')
C. 0
D. 1

II---oooOooo---II

FIRST SEMESTER ASSIGNMENTS

12.2 FIRST SEMESTER: ASSIGNMENT 01

Due date: 13 March 2013

Study material: **(1) F&M: Chapters 1 - 4; Appendix A & Appendix E (Text book)**

(2) Tutorial Letter 102:

Part I: Units 1 – 4;

Part II: ALL (pages 24 – 74); and

Part III: Solution to Self-assessment assignment.

Do the relevant exercises in F&M, Tutorial Letter 102, and the Self-assessment assignment before attempting this assignment. See more information about 102 in Section 2.3.

Submission procedure: Via myUnisa (see Section 8.3)

Year-mark weight: 40%

Unique assignment number: **227606**

Compulsory: To be considered for **examination** in this module, you must submit this assignment by 13 March 2013.

- Each multiple-choice question has four possible answers. You should select the alternative you consider to be the most appropriate.
- Submit your assignment via *myUnisa* by the due date. Do not be concerned if *myUnisa* is down on the last submission date. We are notified and shall take this type of delay into consideration. Try to resubmit the assignment as soon as myUnisa is running again.
- The mark that you achieve from a possible 40 marks will be converted to a **percentage** and will contribute 40% towards your semester mark.

QUESTION 1

On which model are today's computers based?

1. Von Neumann
2. Pascal
3. Charles Babbage
4. Bill Gates

QUESTION 2

Since 1950, historians have divided computer software and hardware into generations. Which generation witnessed the appearance of microcomputers?

1. Second
2. Third
3. Fourth
4. Fifth

QUESTION 3

Which of the following is NOT true about the about a universal machine proposed by Alan Truing?

1. It should have input data
2. It should generate output data
3. It is a specific-purpose computing machine
4. It is a general purpose computing machine

QUESTION 4

According to F & M, what is the main feature/conceptof Turing or von Neumann Models?

1. Data
2. Program
3. Algorithm
4. Memory

QUESTION 5

Which of the following defines a situation where a person thinks that life cannot be lived without a computer?

1. Social justice
2. Digital divide
3. Computer dependency
4. Computer ethics

QUESTION 6

Computer science can be dived into two categories, namely, system areas and application areas. Which of the following belongs to application areas?

1. Computer databases
2. Computer networking
3. Computer architecture
4. Computer security

QUESTION 7

There are many antivirus software packages sold in computer shops. One of the main uses of antivirus programs is to minimise _____.

1. Computer privacy
2. Computer crime
3. Electronic copyright
4. Computer security

QUESTION 8

Convert $(55)_{10}$ to a hexadecimal number.

1. $(49)_{16}$
2. $(37)_{16}$
3. $(16)_{16}$
4. $(51)_{16}$

QUESTION 9

Convert $(1011.11)_{2}$ to an octal number.

1. $(11.3)_{8}$
2. $(51.3)_{8}$
3. $(13.6)_{8}$
4. $(17.6)_{8}$

QUESTION 10

Which one of the following number representations is NOT correct?

1. $(11.2)_{2}$
2. $(11.1)_{8}$
3. $(A1B)_{16}$
4. $(58)_{10}$

QUESTION 11

Convert $(11)_{16}$ to a binary number.

1. $(10001)_2$
2. $(1,1)_2$
3. $(11)_2$
4. $(10111)_2$

QUESTION 12

Convert $(77)_{10}$ to an octal number.

1. $(111)_8$
2. $(115)_8$
3. $(155)_8$
4. $(77)_8$

QUESTION 13

Which of the following is False?

1. $(1)_{10} = (1)_2$
2. $(17)_8$ is greater than $(15)_{10}$
3. $(10)_2$ is an even number
4. $(B)_{16}$ is equal to $(11)_{10}$

QUESTION 14

What is the 2's complement representation of −22 using 6 bits?

1. $(101001)_2$
2. $(010011)_2$
3. $(010110)_2$
4. $(101010)_2$

QUESTION 15

Convert $(101101.01)_2$ to normalised form.

1. $(0.10110101)_2 \times (2^{-6})_{10}$
2. $(0.10110101)_2 \times (2^{6})_{10}$
3. $(1.0110101)_2 \times (2^{-5})_{10}$
4. $(1.0110101)_2 \times (2^{5})_{10}$

QUESTION 16

If you wanted to know the precision of the fractional part of a normalised number stored in a computer you would check its _____.

1. mantissa
2. sign
3. exponent
4. floating point

QUESTION 17

Which one of the following refers to the process of rounding the value of a sample to the closest integer value when storing audio?

1. Sampling
2. Quantisation
3. Encoding
4. Compression

QUESTION 18

How many bits are there in 8 bytes?

1. 1
2. 8
3. 16
4. 64

QUESTION 19

Which logical operation is associated with ‘unsetting’ specific bits in a bit pattern?

1. OR
2. AND
3. XOR
4. NOT

QUESTION 20

Which one of the following is an application of the AND operator?

1. To set specific bits in a bit pattern.
2. To flip specific bits in a bit pattern.
3. To unset specific bits in a bit pattern.
4. To complement all the bits in a bit pattern.

QUESTION 21

Calculate: $(1011.01)_2 + (111)_2$.

1. $(1101.00)_2$
2. $(10010.01)_2$
3. $(1101.01)_2$
4. $(10010.00)_2$

QUESTION 22

Calculate: $(1011)_2$ XOR $(1101)_2$.

1. $(0011)_2$
2. $(0110)_2$
3. $(0111)_2$
4. $(111)_2$

QUESTION 23

Use an arithmetic right shift operation on the bit pattern 10001101. The pattern is an integer in two's complement format.

1. $(10001101)_2$
2. $(01110010)_2$
3. $(11000110)_2$
4. $(11000111)_2$

QUESTION 24

Which logical operation on two input patterns has the following property?

"If a bit in one input is 1, there is no need to check the corresponding bit in the other input. The result is always 1."

1. OR
2. AND
3. XOR
4. NOT

Apply Boolean algebra rules in the following THREE questions.

QUESTION 25

What is the simplest form of the Boolean function x + (x′ . y)?

1. 1
2. x + y
3. x′ + y′
4. x . y

QUESTION 26

What is the simplest form of the Boolean function xy′ + xy′z′ + xy′z?

1. xy′(z′ + z)
2. xy′z′ + xy′z
3. 1
4. xy′

QUESTION 27

What is the simplest form of the Boolean function (x+ y) ′. y′ ?

1. x′y′
2. x′y
3. x + y
4. x′ + y′

QUESTION 28

Consider the following Boolean function:

$$F(x,y,z) = m_1 + m_2 + m_5 + m_7$$

Which one of the following four Karnaugh diagrams represents the given function?

1.

	y'z'	y'z	yz	yz'
x'	1		1	1
x			1	

2.

	y'z'	y'z	yz	yz'
x'		1		1
x	1			1

3.

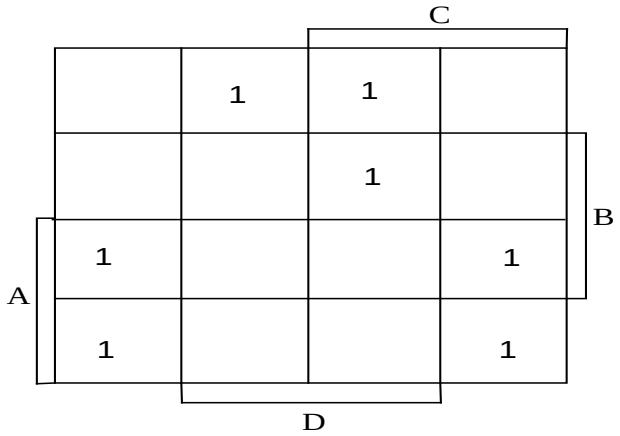
	y'z'	y'z	yz	yz'
x'		1		1
x		1	1	

4.

	y'z'	y'z	yz	yz'
x'	1		1	1
x				1

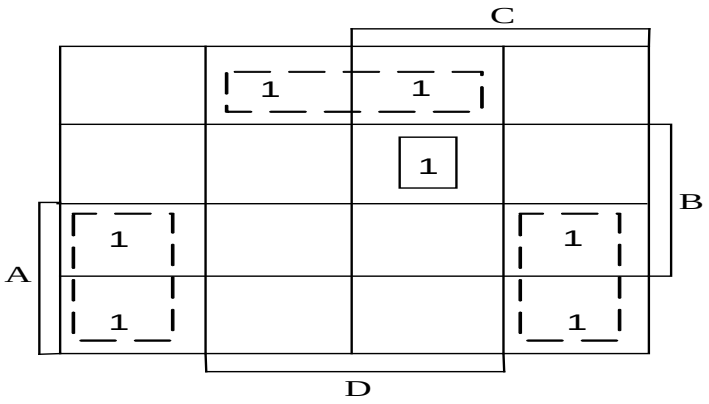
QUESTION 29

Consider the following Karnaugh map:

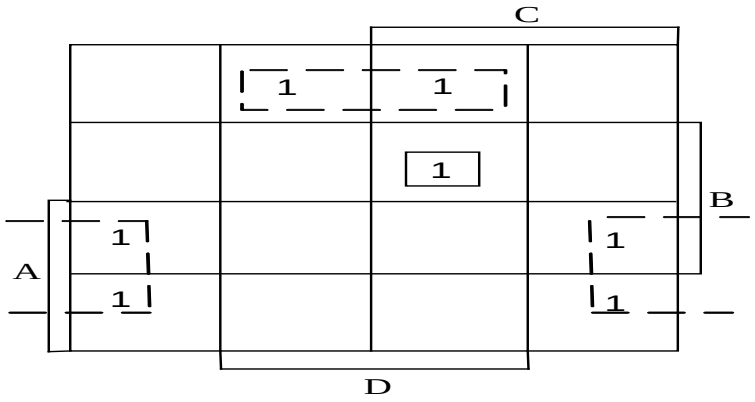


Which one of the following four Karnaugh maps reflects the correct forming of groups?

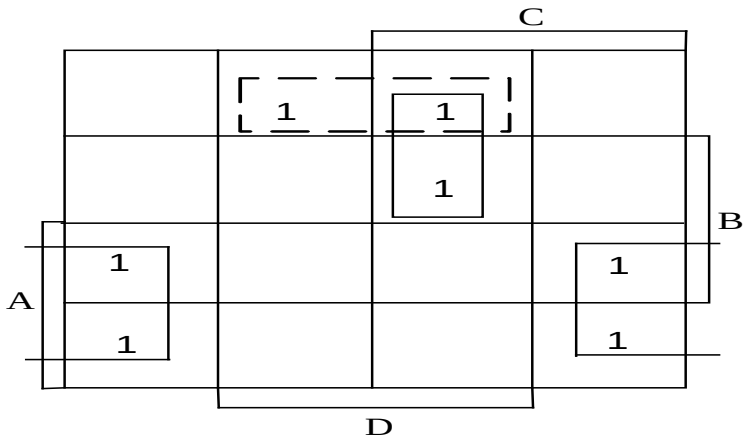
1.



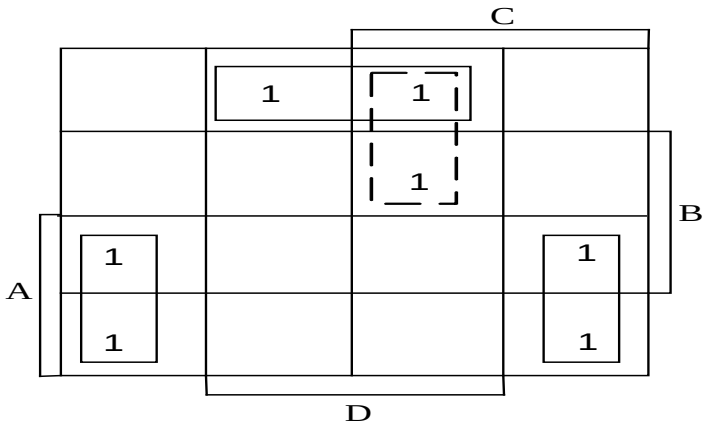
2.



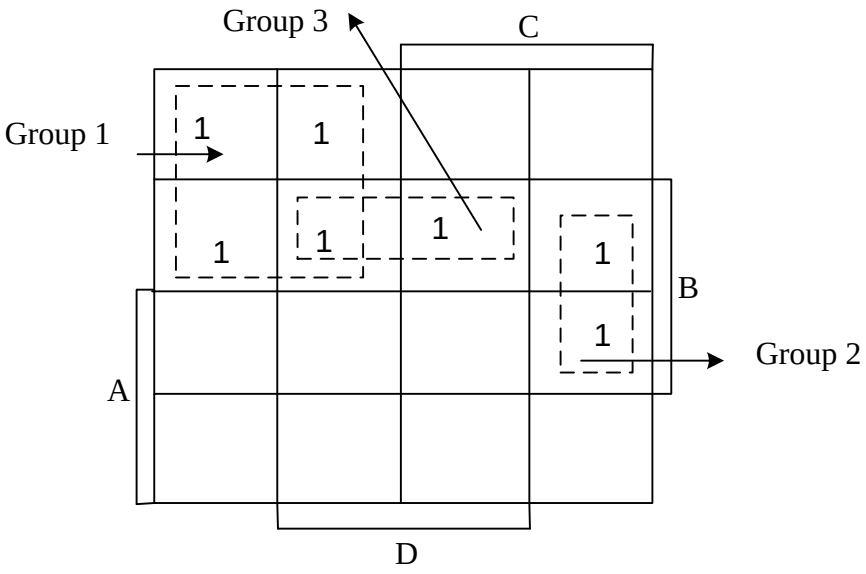
3.



4.



The next THREE questions refer to the Karnaugh map below:



QUESTION 30

Which term represents Group 1?

1. A′C′
2. AC
3. A
4. A′

QUESTION 31

Which term represents Group 2?

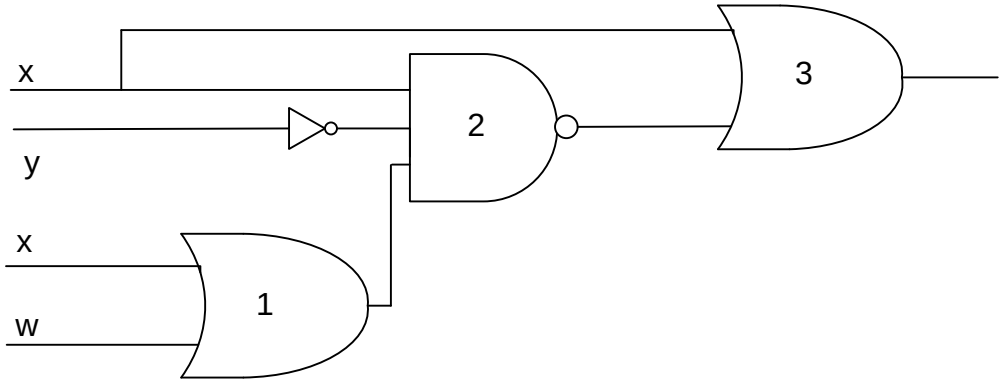
1. BC
2. BC′D′
3. BCD′
4. AC

QUESTION 32

Which term represents Group 3?

1. ABD
2. D
3. ACD
4. A′BD

The next THREE questions refer to the following combinational logic circuit:



QUESTION 33

What is the output of Gate 1?

1. x′ + w
2. x.w
3. x′ + w′
4. x + w

QUESTION 34

What is the output of Gate 2?

1. [(x + w).y′.x]′
2. (x′ + w) **+** y′ **+** x
3. [(x**.**w)+ y′ **+** x]′
4. (x′ + w′)**.**y′·x

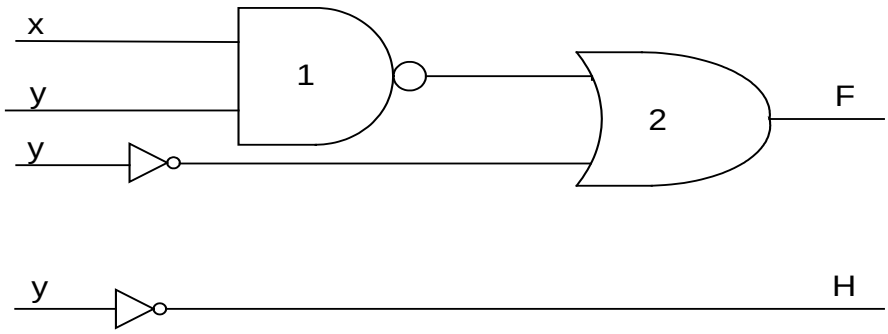
QUESTION 35

What is the output of Gate 3?

1. (x·w)+ y′ **+** x]′**.** x
2. [(x′ + w′)**.**y′·x] **.** x′
3. [(x + w).y′.x]′ + x
4. [(x′ + w) **+** y′ **+** x] **.**x′

QUESTION 36

Consider the following two logic circuits:



These two logic circuits are not equivalent. F = (xy)′ + y′ and H = y′. One of the two gates can be changed so that the circuits can become equivalent. Which gate can be changed and what kind of gate must it become?

1. Gate 2 must change to an AND gate.
2. Gate 1 must change to an AND gate.
3. Gate 2 must change to a NAND gate.
4. Gate 1 must change to an OR gate.

Consider the following scenario:

A family has three mobile phones (cell phones) in their home. The mother wants to go to a shopping centre (mall) to buy groceries.

Cell Phone A has Bluetooth and Camera, **Cell Phone B** has Bluetooth and a GPS, and **Cell Phone C** has 3G and a GPS.

If the mother takes Cell Phone A then variable A = 1, If the mother takes Cell Phone B then variable B = 1 and If the mother takes Cell Phone C then variable C = 1. For example, if A = 1, B = 1 and C = 0, it means that the mother takes both cell phones A (Bluetooth and Camera) and B (Bluetooth and GPS) with her. In this case she will have facilities for Bluetooth, Camera and GPS.

A Boolean function F(A,B,C) is defined as follows: **F(A,B,C) = 1 when the mother has facilities for <u>at least</u> Bluetooth and GPS while at the mall,** otherwise F(A,B,C) = 0.

Different combination inputs for A, B and C are given in the tables in the following FOUR questions. The question that should be answered in each case is: Which alternative shows the correct outputs for F?

QUESTION 37

			Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**F**	**F**	**F**	**F**
0	0	0	0	1	0	1
0	0	1	0	1	1	0

QUESTION 38

			Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**F**	**F**	**F**	**F**
0	1	0	0	1	0	1
0	1	1	0	1	1	0

QUESTION 39

			Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**F**	**F**	**F**	**F**
1	0	0	0	1	0	1
1	0	1	0	1	1	0

QUESTION 40

			Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**F**	**F**	**F**	**F**
1	1	0	0	1	0	1
1	1	1	0	1	1	0

12.3 FIRST SEMESTER: ASSIGNMENT 02

Due date: 16 April 2013

Study material: **(1) F&M: Chapters 5 – 14. Chapter 12 is not included.**

(2) Tutorial Letter 102: Part I: Units 5 – 14

Please read the relevant study material in F&M and Tutorial Letter 102before attempting this assignment. See more information about 102 in Section 2.3 of this tutorial letter.

Submission procedure: Via myUnisa (see Section 8.3)

Year-mark weight: 60%

Unique assignment number: **361660**

Compulsory: It contributes towards the year mark.

- Each multiple-choice question has four possible answers. You should select the alternative you consider to be the most appropriate.
- Submit your assignment via *myUnisa* by the due date. Do not be concerned if *myUnisa* is down on the last submission date. We are notified and shall take this type of delay into consideration. Try to resubmit the assignment as soon as myUnisa is running again.
- The mark that you achieve from a possible 50 marks will be converted to a **percentage** and will contribute 60% towards your semester mark.

FIRST SEMESTER ASSIGNMENT 02

QUESTION 1

A computer has 1024 MB of memory. Each word in this computer is 32 bytes. How many bits are needed to address any single word in memory?

1. 24
2. 25
3. 26
4. 27

QUESTION 2

In the fetch stage of the machine cycle used by the CPU, _____.

1. instructions are decoded by the control unit
2. the contents of two input registers are added
3. the task order is sent to a component in the CPU
4. the address of the instruction to be copied is held in the program counter register

QUESTION 3

Which one of the following statements best describes the main characteristic of RISC computer architecture?

1. It is easier than other designs because there is a single instruction for both simple and complex tasks.
2. A complex instruction is transformed into a set of simple operations and then executed by the CPU.
3. A small set of instructions does a minimum number of simple operations.
4. Micromemory holds the set of operations for each complex instruction in the instruction set.

QUESTION 4

Which network topology requires the largest number of cabling and input/output ports?

1. Ring
2. Star
3. Bus
4. Mesh.

QUESTION 5

What is the name of a central controller on which all the other computer network devices are connected using dedicated point-to-point links?

1. A hub
2. A ring
3. A backbone
4. A workstation.

QUESTION 6

Which set of rules has been created for the internet to divide the services needed to perform a task?

1. Principles
2. Packets
3. Protocols
4. Procedures.

QUESTION 7

Which of the following is NOT involved during the setting up of an email service?

1. SMTP
2. POP3
3. FTP
4. IMAP

QUESTION 8

There are several layers in a TCP/IP protocol suite. What is the role of the transport layer?

1. The movements of individual bits from one node to the next.
2. Node-to-node delivery of frames.
3. Provision of services to the users.
4. The logical delivery of a message between client and server processes.

QUESTION 9

Which of the following is NOT a basic requirement for the WWW?

1. Domain name
2. Web server
3. Browser
4. HTTP.

QUESTION 10

Which one of the following statements regarding the evolution of computer operating systems and hardware is NOT TRUE?

1. Batch operating systems were designed in the 1950s to control mainframe computers.
2. DOS was one of the first single-user operating systems on personal computers.
3. Distributed systems require more than one CPU on a single computer.
4. Multiprogramming and time-sharing required the operating system to do scheduling.

QUESTION 11

An operating system (OS) can be designed as a modular architecture. The purposed is to allow higher layers to be changed over time without affecting the lower layers. This property refers to the _____ of the OS.

1. extensibility
2. reliability
3. compatibility
4. portability

QUESTION 12

Multiprogramming without swapping can be called _____.

1. demand paging
2. paging
3. demand segmentation
4. queuing

QUESTION 13

Which of the following best describes monoprogramming?

1. One program is written for the computer.
2. One program occupies the computer memory at a time.
3. One program is always in the waiting state mode.
4. One program occupies the hard drive.

QUESTION 14

Which of the following can ONLY be in ready, waiting or running states?

1. Program
2. Process
3. Scheduler
4. Job

QUESTION 15

The operating system synchronises different processes with different resources but a deadlock can occur. There are four necessary conditions for a deadlock to occur. Which of the following is the correct description of the 'MUTUAL EXCLUSION' condition?

1. The operating system cannot temporarily relocate a resource.
2. A process holds a resource even though it cannot use it until other resources are available.
3. All processes and resources involved form a loop.
4. Only one process can hold a resource.

QUESTION 16

A list contains the following elements:

8 12 19 21 38 42 55 70 77 82 85 99 121 155 200

At the beginning, first = 1, mid = 8 and last = 15. What are the values of first, mid and last respectively after two more iterations of the binary search algorithm if the goal is 82?

1. 8, 11, 15
2. 9, 10, 11
3. 9, 12, 15
4. 13, 14, 15

QUESTION 17

Suppose a list contains the following elements:

45 49 61 37 78 30 100

What is the order of the elements in the list after three passes if selection sort is used?

1. 30 37 45 49 78 61 100
2. 30 37 61 49 78 45 100
3. 30 45 37 49 61 78 100
4. 30 37 45 49 61 78 100

QUESTION 18

How many constructs do computer scientists recommend for any structured program or algorithm?

1. 2
2. 3
3. 4
4. 5

QUESTION 19

Which one of the following statements regarding search algorithms is NOT TRUE?

1. A sequential search is very slow.
2. A sequential search is usually used for small lists.
3. A binary search requires the list to be sorted.
4. A binary search starts at the beginning of the list.

QUESTION 20

An English-language-like representation of a step-by-step solution that expresses a logical solution to a particular problem of interest is best described as _____.

1. A process.
2. An algorithm.
3. A pseudocode
4. A program code.

QUESTION 21

What is a pictorial representation of an algorithm?

1. Pseudocode
2. UML
3. A subroutine
4. A subalgorithm

QUESTION 22

The only language understood by computer hardware is _____ language.

1. high-level
2. natural
3. machine
4. mnemonic

QUESTION 23

Compilation_____.

1. translates the whole source program into the object module before executing it
2. is a slow process in comparison to interpretation
3. is used in the first approach to interpretation
4. translates and executes the source code a line at a time

QUESTION 24

The two methods that are used for translating a program to machine language both follow the same translation process. What is the SECOND step in the process?

1. Syntax analysis
2. Semantic analysis
3. Lexical analysis
4. Code generation

QUESTION 25

In which two forms can a final program in Java be?

1. An application or a function
2. A function or a procedure
3. A procedure or an applet
4. An application or an applet

QUESTION 26

With which computer language paradigm are the terms *inheritance*, *polymorphism* and *methods* associated with?

1. Procedural
2. Functional
3. Object-oriented
4. Declarative

QUESTION 27

Which programming language paradigm uses the principle of logical reasoning to answer queries?

1. Functional
2. Declarative
3. Procedural
4. Object-oriented

QUESTION 28

The waterfall model is one of the most common models for the development process of the software lifecycle. Which one of the following provides the correct order of phases of the model?

1. Analysis, Design, Testing & Implementation
2. Design, Analysis, Testing & Implementation
3. Design, Analysis, Implementation& Testing
4. Analysis, Design, Implementation & Testing

QUESTION 29

Which of the following diagrams is best suited to use as modelling tool during the object-oriented analysis process in software development?

1. Class diagram
2. Data flow diagram
3. Entity-relationship diagram
4. State diagram

QUESTION 30

The design phase in the software life cycle uses a well-established principle called _____, where the whole task is divided into smaller tasks.

1. polymorphism
2. subpackaging
3. modularity
4. encapsulation

QUESTION 31

Which one of the following statements about modules in a software system is NOT TRUE?

1. Coupling between modules must be minimised.
2. Cohesion between module must be maximised.
3. Coupling is a measure of how closely the modules are related.
4. Loosely coupled modules are less likely to create errors in related modules.

QUESTION 32

Transferability is one of the measures for software quality. Transferability includes_____.

1. Changeability, reusability and correctability
2. Reusability, interoperability and portability
3. Flexibility, portability and interoperability
4. Reliability, changeability and flexibility

QUESTION 33

Documentation is needed for proper and efficient usage and maintenance of software. System documentation_____.

1. describes the installation and the servicing of the software
2. defines the software itself
3. can be a very powerful marketing tool
4. shows how to use the software step by step

QUESTION 34

In an array, for example SCORES [2], the ordinal number in the square brackets, such as 2 in this example, is the _____ of the array.

1. ordinal
2. index
3. element
4. format

QUESTION 35

A linked list is an ordered collection of data in which each element contains the _____ of the next element.

1. node
2. array
3. field
4. location

QUESTION 36

A record is a type of data structure. Which one of the following statements about a RECORD is NOT TRUE?

1. The elements can be of the same or different types.
2. Each element is called a field.
3. All elements must be related.
4. Fields must be assigned ordinal (number) values.

QUESTION 37

Which one of the following statements best describes a data structure?

1. It is a sequenced collection of elements usually of different data types.
2. It is a set of data items that share general relationships.
3. It is a collection of related variables that can be accessed individually or as a whole.
4. It is a set of data items of different data types.

QUESTION 38

Which two components make up a linked list?

1. Data and link
2. Data and value
3. Link and pointer
4. Node and value

QUESTION 39

Which one of the following statements regarding a linked list is NOT TRUE?

1. It is an efficient data structure for storing data that will go through a number of insertions and deletions.
2. It is a dynamic data structure.
3. It can start with no nodes.
4. A node cannot easily be deleted without affecting other nodes.

QUESTION 40

There are three basic types of changes in all sequential file updates. Which of the following is not one of the three?

1. Add transactions
2. Delete transactions
3. Error transactions
4. Change transactions

QUESTION 41

Which of the following set of file types have random access file structures?

1. Indexed and inverted
2. Indexed and hashed
3. Inverted and indexed
4. Flat and inverted

QUESTION 42

Which of the following is not a hashing method?

1. Indirect hashing
2. Direct hashing
3. Modulo division hashing
4. Digital extraction hashing

QUESTION 43

What name is given to the event that occurs when a hashing algorithm produces an address for an insertion key but the address is already occupied?

1. Resolution
2. Deadlocking
3. Starvation
4. Collision

QUESTION 44

Which of the following statements regarding directories is NOT TRUE?

1. Directories are provided by most operating systems for organising files.
2. In most operating systems directories are organised like a tree abstract data type in which each directory, except the root directory, has a parent directory.
3. A subdirectory specifically refers to a directory within a root directory.
4. In most operating systems a directory is represented as a special type of file that holds information about other files.

QUESTION 45

Which of the following best describes a combination of hardware, software, data, users and procedures?

5. Database
6. Database administrator
7. Database management system
8. Database architecture

QUESTION 46

Which of the following database models are obsolete?

1. Hierarchical and network
2. Hierarchical and object-oriented
3. Network and relational
4. Object-oriented and distributed

QUESTION 47

Which of the following is NOT a defined operation on relational databases?

1. Delete
2. Join
3. Update
4. Add

QUESTION 48

In a relational database, each row in a relation is called _____.

1. a tuple
2. an attribute
3. a field
4. an entity

QUESTION 49

What is TRUE about the database abbreviation SQL?

1. It stands for Standard Query Language.
2. It is a declarative language.
3. It is a procedural language.
4. It was developed for use in object-oriented databases.

QUESTION 50

According to the prescribed textbook of this module / subject, on which model is a distributed database based?

1. Relational
2. Object-oriented
3. Network
4. Hierarchical

II---oooOooo---II

SECOND SEMESTER ASSIGNMENTS

12.4 SECOND SEMESTER: ASSIGNMENT 01

Due date: 28 August 2013

Study material: **(1) F&M: Chapters 1 - 4; Appendix A & Appendix E (Text book)**

(2) Tutorial Letter 102:

Part I: Units 1 – 4;

Part II: ALL (pages 24 – 74); and

Part III: Solution to Self-assessment assignment.

Do the relevant exercises in F&M, Tutorial Letter 102, and the Self-assessment assignment before attempting this assignment. See more information about 102 in Section 2.3.

Submission procedure: Via myUnisa (see Section 8.3) or by post

Year-mark weight: 40%

Unique assignment number: **214385**

Compulsory: To be considered for **examination** in this module, you must submit this assignment by 28 August 2013.

- Each multiple-choice question has four possible answers. You should select the alternative you consider to be the most appropriate.
- Submit your assignment via *myUnisa* or by post by the due date. Do not be concerned if *myUnisa* is down on the last submission date. We are notified and shall take this type of delay into consideration. Try to resubmit the assignment as soon as myUnisa is running again.
- The mark that you achieve from a possible 40 marks will be converted to a **percentage** and will contribute 40% towards your semester mark.

QUESTION 1

According to the von Neumann model, memory subsystem is responsible for storing _____.

1. only data
2. only programs
3. programs and data
4. programs and processes

QUESTION 2

Since 1950, historians have divided computer software and hardware into generations. Which generation witnessed the appearance of laptops and the use of multimedia?

1. Third
2. Fourth
3. Fifth
4. Sixth

QUESTION 3

Which of the given options is NOT True? Since the 1950, computers have general become_____.

1. faster
2. smaller
3. cheaper
4. heavier

QUESTION 4

Before cell phones (mobile phones) emerged, some people used to communicate using emails and others used post office (Snail) mail. However, this communication gap has narrowed with the use of SMSs using cell phones. What name is given to the situation described here?

1. Dependency
2. Social justice
3. Digital divide
4. Privacy

QUESTION 5

What name is given to a set of instructions that tells the computer what to do with data?

1. A program
2. An algorithm
3. A data processor
4. An operating system

QUESTION 6

The first electronic special-purpose computer was called_____.

1. ABC
2. Pascaline
3. ENIAC
4. Pascal

QUESTION 7

The area of the design and writing of structured programs that follow strict rules and principles is known as _____.

1. Software engineering
2. Application development
3. Algorithm design
4. Program development

QUESTION 8

Convert $(38)_{16}$ to a decimal number.

1. 26
2. 38
3. 40
4. 56

QUESTION 9

Convert $(1001.01)_2$ to an octal number.

1. $(11.2)_8$
2. $(12.2)_8$
3. $(22.2)_8$
4. $(14.6)_8$

QUESTION 10

What is the normalised form of $(1111.101)_2$?

1. $(1.111101)_2 \times (2^{-2})_{10}$
2. $(1.111101)_2 \times (2^{2})_{10}$
3. $(1.111101)_2 \times (2^{3})_{10}$
4. $(1.111101)_2 \times (2^{4})_{10}$

QUESTION 11

Convert $(34)_{10}$ to a hexadecimal number.

1. $(34)_{16}$
2. **$(22)_{16}$**
3. $(24)_{16}$
4. $(42)_{16}$

QUESTION 12

Convert $(22)_{16}$ to a binary number.

1. $(1111)_2$
2. $(1010)_2$
3. $(100010)_2$
4. $(111100)_2$

QUESTION 13

Which of the following is False?

1. $(0)_{10} = (0)_2$
2. $(10)_8$ is less than $(10)_{10}$
3. $(10)_{16}$ is an even number
4. $(F)_{16}$ is equal to $(14)_{10}$

QUESTION 14

What is the signed-and-magnitude representation of − 20 using 8 bits?

1. $(00010100)_2$
2. $(10010100)_2$
3. $(00000010)_2$
4. **$(10000010)_2$**

QUESTION 15

Which of the following unsigned integer will cause an overflow in a*n*-bit memory location?

1. 0
2. 2n - 1
3. 2n
4. 2n-1

QUESTION 16

Samples are taken if all the values of an audio signal cannot be recorded. The number of samples needed to retrieve a replica of the original image depends on _____.

1. quantisization
2. encoding
3. the number of bits assigned to each sample
4. the maximum number of changes in the analog signal

QUESTION 17

Which of the following is NOT TRUE of computer images?

1. JPEG (Joint Photographic Experts Group) uses the indexed colour scheme.
2. Raster graphics is used when we need to store an analog image (e.g. a photograph).
3. The number of bits used to represent a pixel depends on how a pixel's colour is handled by different encoding techniques.
4. The scanning rate in image processing is called resolution.

QUESTION 18

How many bytes should be used for a 32-bit pattern?

1. 4
2. 5
3. 16
4. 32

QUESTION 19

Which logical operation is associated with 'setting' specific bits in a bit pattern?

1. OR
2. AND
3. XOR
4. NOT

QUESTION 20

What is the result of $(1101\ 0111)_2$ AND $(0101\ 0101)_2$?

1. 11010111
2. 01010101
3. 10100100
4. 11111111

QUESTION 21

Calculate: $(101011.1)_2 + (11001.01)_2$.

1. $(1110010.10)_2$
2. $(1000010.01)_2$
3. $(10010011.11)_2$
4. $(1000100.11)_2$

QUESTION 22

Calculate: $(1010)_2$ XOR $(1001)_2$.

1. $(0011)_2$
2. $(0110)_2$
3. $(0111)_2$
4. $(1111)_2$

QUESTION 23

Use the arithmetic left shift operation on the bit pattern 11001101. The pattern is an integer in two's complement format.

1. $(10011010)_2$
2. $(11001101)_2$
3. $(11000110)_2$
4. $(11100101)_2$

QUESTION 24

Which logical operation on two input patterns has the following property?

"If a bit in one input is 0, there is no need to check the corresponding bit in the other input. The result is always 0."

1. AND
2. OR
3. XOR
4. NOT

Apply Boolean algebra rules to determine the simplest forms of the given Boolean functions in the following THREE questions:

QUESTION 25

What is the simplest form of the Boolean function (x′y + 1)′ ?

1. x + y′
2. (xy′) + 1′
3. 1
4. 0

QUESTION 26

What is the simplest form of the Boolean function (x .y) + x′?

1. x′
2. xx + yx’
3. x′ + y
4. x

QUESTION 27

What is the simplest form of the Boolean function x′y′z + xy′z′ + xy′z + xyz′ + xyz ?

1. 1
2. x + y′z
3. x′y′z + xy′ + yz
4. x′y′z′

QUESTION 28

Consider the following Boolean function:

$$F(x,y,z) = m_0 + m_3 + m_5 + m_7$$

Which one of the following four Karnaugh diagrams represents the given function?

1.

	y'z'	y'z	yz	yz'
x'	1			1
x		1		1

2.

	y'z'	y'z	yz	yz'
x'	1		1	
x		1	1	

3.

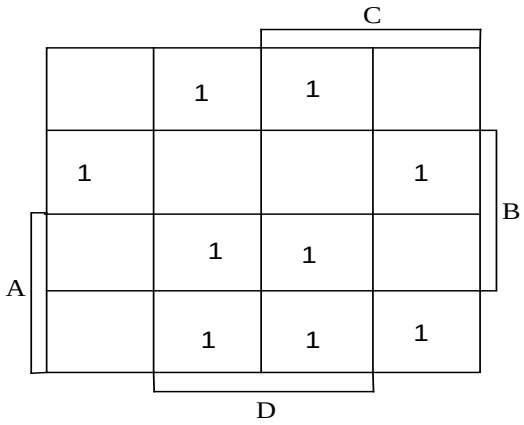
	y'z'	y'z	yz	yz'
x'	1	1		
x	1	1		

4.

	y'z'	y'z	yz	yz'
x'	1		1	
x		1		1

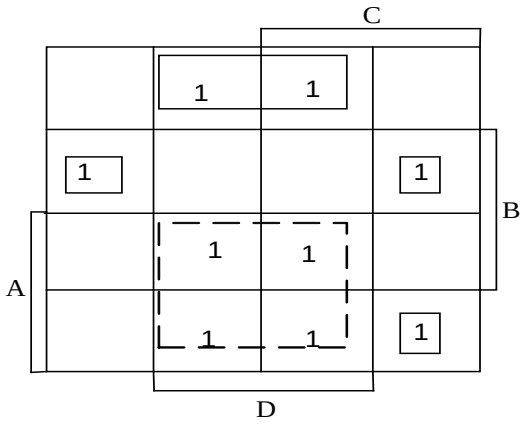
QUESTION 29

Consider the following Karnaugh map:

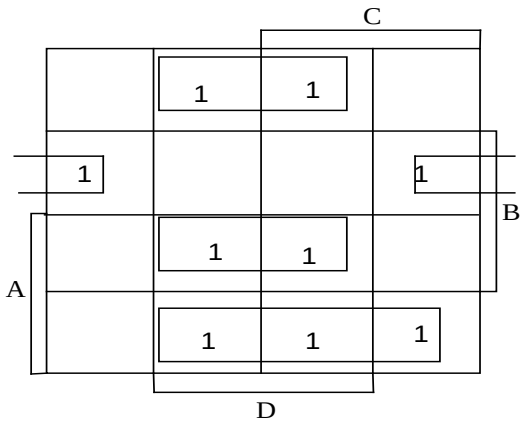


Which one of the following four Karnaugh maps reflects the correct forming of groups?

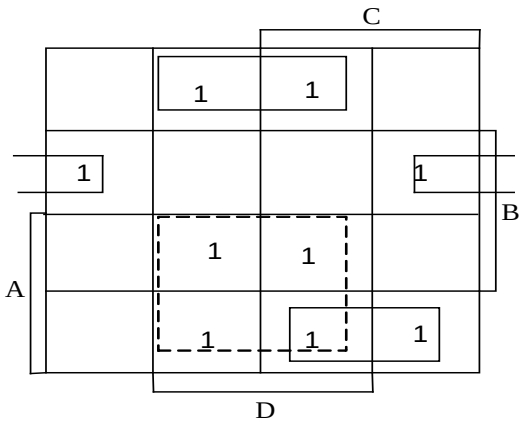
1.



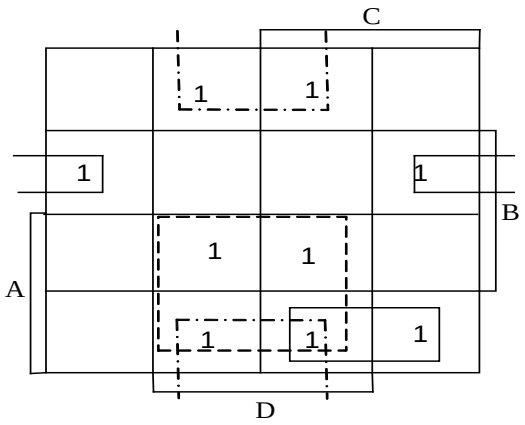
2.



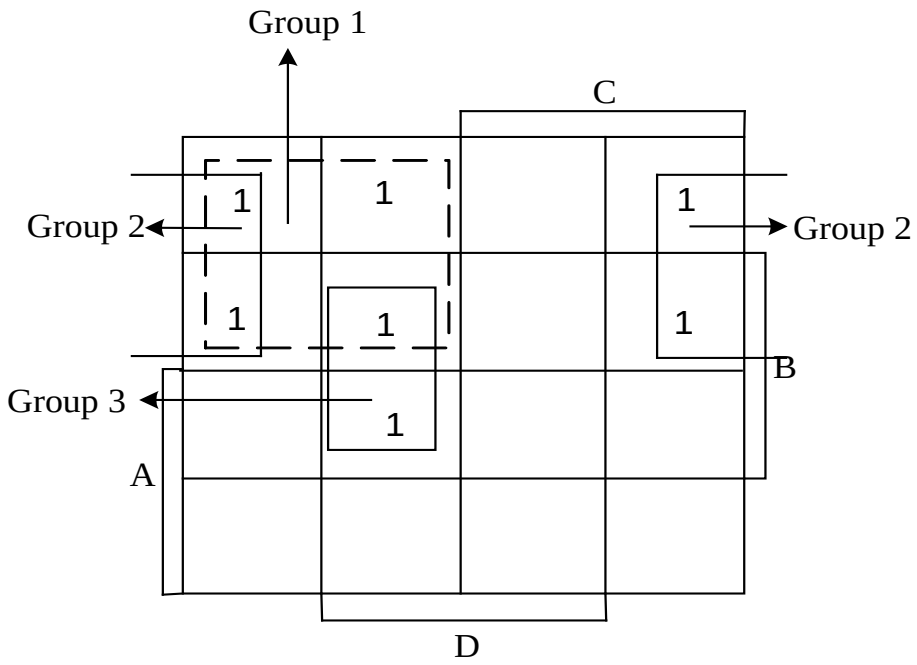
3.



4.



The following THREE questions refer to the Karnaugh map below:



QUESTION 30

Which term represents Group 1?

1. A′BD′
2. A′C′
3. A′D′
4. A′B

QUESTION 31

Which term represents Group 2?

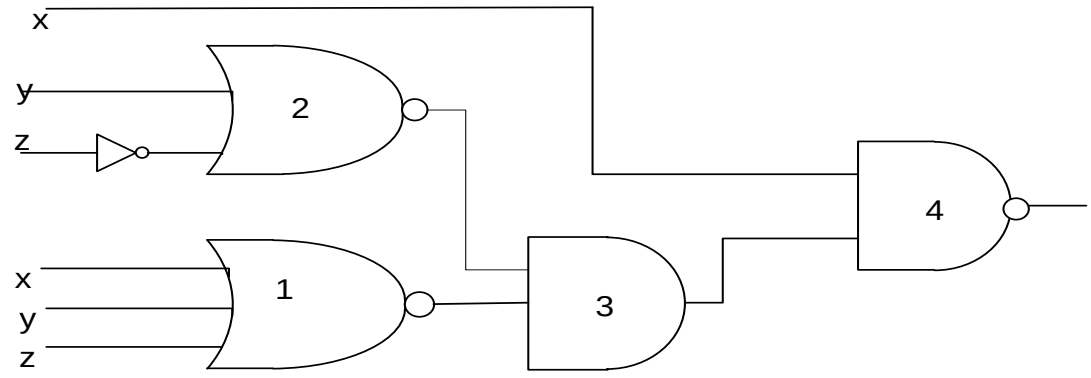
1. BC′
2. AC′
3. A′D′
4. A′C′

QUESTION 32

Which term represents Group 3?

1. ABC
2. B′CD
3. BC′D
4. BC′D′

The following FOUR questions refer to the following combinational logic circuit:



QUESTION 33

What is the output of Gate 1?

1. (x + y + z)'
2. x' + y' + z'
3. x.y.z
4. (x .y.z)′

QUESTION 34

What is the output of Gate 2?

1. y + z '
2. (y + z ') '
3. y.z '
4. (y.z')’

QUESTION 35

What is the output of Gate 3?

1. (x.y.z) '. (y.z') '
2. (x' + y' + z'). (y . z')
3. ((x' + y' + z'). (y + z ')) '
4. ((x + y + z)'. (y + z ') '

QUESTION 36

What is the output of Gate 4?

1. (((x + y + z)'. (y + z ') ') . x) '
2. (x.y.z) '. (y.z') ' . x'
3. (((x' + y' + z'). (y + z ') ') .x)'
4. (((x' + y' + z'). (y . z') '. x) '

Consider the following scenario:

On a university building construction site, various people deliver different colours of paint containers to the colour mixing machine as follows:

Person A: red & blue; **Person B**: green & black; **Person C**: blue & white

When a person delivers two containers of different colours (as mentioned above), the output is 1. For example, if A = 1, B = 1 and C = 0, person A delivers red and blue, and person B delivers green and black, so the group of three persons delivers only 4 (four) different colours.

A Boolean function F(A,B,C) outputs a 1 if a group of three persons delivers more than 3 (three) different colours.

Different combination inputs for A, B and C are given in the tables in the following FOUR questions. Which alternative shows the correct outputs for F in EACH of the following FOUR questions?

QUESTION 37

			Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**F**	**F**	**F**	**F**
1	1	1	0	1	0	1
0	0	1	0	1	1	0

QUESTION 38

			Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**F**	**F**	**F**	**F**
1	0	1	0	1	0	1
1	0	0	0	1	1	0

QUESTION 39

			Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**F**	**F**	**F**	**F**
0	1	0	0	1	0	1
0	1	1	0	1	1	0

QUESTION 40

			Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**F**	**F**	**F**	**F**
0	0	0	0	1	0	1
1	1	0	0	1	1	0

12.5 SECOND SEMESTER: ASSIGNMENT 02

Due date: 1 October 2013

Study material: **(1) F&M: Chapters 5 – 14. Chapter 12 is not included.**

(2) Tutorial Letter 102: Part I: Units 5 – 14

Please read the relevant study material in F&M and Tutorial Letter 102before attempting this assignment. See more information about 102 in Section 2.3 of this tutorial letter.

Submission procedure: Via myUnisa (see Section 8.3) or by post

Year-mark weight: 60%

Unique assignment number: **277130**

Compulsory: It contributes towards the year mark.

- Each multiple-choice question has four possible answers. You should select the alternative you consider to be the most appropriate.
- Submit your assignment via *myUnisa* or by post by the due date. Do not be concerned if myUnisa is down on the last submission date. We are notified and shall take this type of delay into consideration. Try to resubmit the assignment as soon as myUnisa is running again.
- The mark that you achieve from a possible 50 marks will be converted to a **percentage** and will contribute 60% towards your semester mark.

QUESTION 1

Which of the following CANNOT be held in a register?

1. data
2. programs
3. instructions
4. program counter values

QUESTION 2

On which of the following storage devices can a user write information only once?

1. CD-R
2. CD-W
3. CD-RW
4. CD-ROM

QUESTION 3

The smallest storage area on a magnetic disk that can be accessed at one time is called a _____.

1. head
2. segment
3. track
4. sector

QUESTION 4

What is the main criterion related to the time needed to recover from a computer network failure?

1. Performance
2. Reliability
3. Security
4. Usability

QUESTION 5

Which of the following does NOT refer to a computer network topology?

1. Hub
2. Star
3. Ring
4. Mesh

QUESTION 6

A company builds a network of computers located in its different offices in an office park. This network would best be described as _____.

1. a WAN
2. a LAN
3. a MAN
4. a WIN

QUESTION 7

A cable in a bus LAN with 100 stations is broken. How many stations are affected by this damage?

1. All 100 stations are affected.
2. 50 stations are affected.
3. Only the stations on the damaged portion of the network are affected.
4. No station is affected.

QUESTION 8

If you wanted to get connected to the internet, you would get in contact with _____.

1. an ISP
2. a TCP
3. an IP
4. an HTTP

QUESTION 9

According to the prescribed textbook, how many layers does a TCP / IP protocol suite have?

1. 3
2. 4
3. 5
4. 6

QUESTION 10

Which of the following facilitates as the interface between the computer hardware and the computer programs?

1. Operating system
2. Application system
3. Interaction software
4. End-user software

QUESTION 11

An operating system (OS) can be programmed in a modular architecture with several layers such that higher layers can be changed without affecting the lower layers. This property refers to the _____ of the OS.

1. reliability
2. extensibility
3. compatibility
4. portability

QUESTION 12

Multiprogramming requires _____operating system.

1. an online
2. a batch-processing
3. a time-sharing
4. a parallel

QUESTION 13

In which category or technique can only one program reside in memory for execution?

1. Paging
2. Partitioning
3. Monoprogramming
4. Multiprogramming

QUESTION 14

Modern operating systems use three different terms that refer to a set of instructions: program, job and process.

Which of the following states are applicable for a process?

1. Ready, running and terminate
2. Waiting, running and terminate
3. Hold, ready and running
4. Ready, waiting and running

QUESTION 15

What name is given to a situation that occurs when an operating system does NOT put resource restrictions on processes?

1. starvation
2. deadlock
3. queue
4. delay

QUESTION 16

A list contains the following elements:

5 10 15 21 33 47 52 61 88 99 100

At the beginning, first = 1, mid = 6 and last = 11. If the goal is 61, what are the values of first, mid and last respectively after one more iteration of the binary search algorithm?

1. 1, 3, 5
2. 6, 8, 10
3. 7, 8, 9
4. 7, 9, 11

QUESTION 17

Suppose a list contains the following elements:

48 96 20 9 91 5

If bubble sort is used, what is the order of the elements in the list after three passes?

1. 5 9 20 48 91 96
2. 5 9 20 96 91 48
3. 5 9 20 48 96 91
4. 5 9 48 96 98 91

QUESTION 18

Which of the following BASIC algorithms can BOTH be used in computer programs?

1. Searching and repetition
2. Repetition and sorting
3. Sorting and searching
4. Searching and looping

QUESTION 19

Which of the following is NOT TRUE of a structured chart?

1. It is used at the design level.
2. It is used at the programming level.
3. It shows the relationships between algorithms and subalgorithms.
4. It is a high-level tool.

QUESTION 20

Which of the following is NOT a list sorting algorithm?

1. Placement
2. Bubble
3. Selection
4. Insertion

QUESTION 21

Which one of the following statements regarding an algorithm is NOT TRUE?

1. It shows how a problem can be solved.
2. It accepts input data.
3. It creates output data.
4. It can only be shown using a diagram.

QUESTION 22

Which of the four options is best described by the definition below?

“A set of predefined words that combine into a program according to predefined rules.”

1. Computer language
2. Computer process
3. Computer task
4. Algorithm

QUESTION 23

To which form of program does a compiler translate the whole source program?

1. Target
2. Symbolic
3. High-level
4. Object

QUESTION 24

During the source code translation process, the source file goes through a series of sub-processes to its final output. In which sub-process is a list of tokens created?

1. syntax analysis
2. lexical analysis
3. code generation
4. semantic analysis

QUESTION 25

What are the two most common programming paradigms in use today? (This can be deduced by the number of computer languages developed to support each of these paradigms.)

1. Declarative and Object-oriented
2. Functional and procedural
3. Proceduraland object-oriented
4. Declarative and functional

QUESTION 26

Which one of the following languages is totally class-oriented?

1. Java
2. C++
3. Prolog
4. C

QUESTION 27

In the Scheme version of LISP, if S = (17 23 65 80 97 98 105 205), then (car (cdr (cdr S))) would give a result of:

1. 17
2. 23
3. 65
4. 80

QUESTION 28

In what phase of the waterfall model of software development is the emphasis on *what* the software will do without specifying *how* it will be done?

1. Analysis
2. Design
3. Implementation
4. Testing

QUESTION 29

Which one of the following diagrams is commonly used during the analysis phase of the object-oriented analysis?

1. Data flow diagram
2. Entity-relationship diagram
3. Use-case diagrams
4. Structured chart

QUESTION 30

Which one of the following is NOT considered to be an attribute of transferability when considering software quality?

1. Portability
2. Changeability
3. Interoperability
4. Reusability

QUESTION 31

Which of the following is NOT TRUE of the coupling of modules in a system?

1. Coupling is a measure of how tightly two modules are bound to each other.
2. The more tightly coupled the modules are, the less dependent they are.
3. Coupling between modules must be minimised.
4. Loosely coupled modules are more likely to be reusable.

QUESTION 32

Basis path testing is a method in which each statement in the software is executed _____.

1. only once.
2. at least once.
3. at least twice.
4. at least three times.

QUESTION 33

Which one of the following statements regarding documentation in the software lifecycle is NOT TRUE?

1. Documentation should be written for expert but not novice users.
2. Service documentation defines how the system should be maintained and updated if necessary.
3. System documentation shows us, step by step, how to use the software.
4. Technical documentation describes the installation and servicing of a software system.

QUESTION 34

Which of the following best describes an array?

1. It is a collection of fields that are all related to one object.
2. It is a linear collection of objects.
3. It is a sequenced collection of elements, normally of the same data type.
4. It is a collection of elements called fields.

QUESTION 35

Which of the following is NOT a possible dimension of an array?

1. 0
2. 1
3. 2
4. 5

QUESTION 36

Which of the following operations are BOTH lengthy and time consuming when the operation has to be done in the middle of an array?

1. Insertion and deletion of elements
2. Insertion and retrieval of elements
3. Deletion and searching of elements
4. Retrieval and searching of elements

QUESTION 37

Which algorithm must be applied to a linked list before an item is inserted into it?

1. Deletion
2. Searching
3. Transversal
4. Retrieval

QUESTION 38

Which two pointers are used when trying to find an element in a linked list?

1. Previous (Pre) and next (Nex)
2. Current (Cur) and Nex
3. Pre and Cur
4. Nex and Null (NuL)

QUESTION 39

Which one of the following statements regarding linked lists is NOT TRUE?

1. A linked list is a suitable structure if a large number of insertions and deletions are needed.
2. Each node in a linked list has an explicit name.
3. The same operations defined for an array can be applied to a linked list.
4. The name of a linked list is the name of the head pointer that points to the first node of the list.

QUESTION 40

The following files are associated with the update program of sequential files:

A. a new master file
B. an old master file
C. a translation file
D. an error report file.

Al**t**ernatives:

1. Only A and C
2. Only A, B and C
3. Only A, B and D
4. Only B, C and D

QUESTION 41

Records can be accessed randomly in the following file structure(s):

A. indexed
B. hashed
C. sequential.

Alternatives:

1. Only A
2. Only B and C
3. Only A and B
4. Only A and C

QUESTION 42

One of the advantages of an indexed file is that you can have more than one index, each with a different key. What name is usually given to this kind of file?

1. Inverted
2. Text
3. Sequential
4. Hashed

QUESTION 43

In direct hashing, _____

1. the key is divided by the file size and the address is the remainder plus 1.
2. the key is the address and no algorithm manipulation is necessary.
3. the address is composed of digits selected from the key.
4. each record must be accessed sequentially.

QUESTION 44

In the open addressing collision resolution method, _____

1. the first record is stored in the home address, but contains a pointer to the second record.
2. bucket hashing is used.
3. each collision resolution decreases the probability of future collisions.
4. data that cannot be stored in the home address can be stored in the next address.

QUESTION 45

What name is given to the total number of rows in a relation in a relational database?

1. Attribute
2. Tuple
3. Multiplicity
4. Cardinality

QUESTION 46

Consider the following statements:

A. The distributed database model is based on the relational database model.
B. In a fragmented distributed database data are localised.
C. In a replicated distributed database, each site holds an exact replica of another site.
D. An object-oriented database tries to keep the advantages of the relational model and, therefore, it does not allow applications to access structured data.

Alternatives:

1. Only A and B are false.
2. Only C and D are false.
3. Only A, B and C are true.
4. Only A, C and D are true.

QUESTION 47

In a relational database several operations can be defined in order to create new relations out of the existing ones. Select the statement that is NOT TRUE regarding operations on relations within the relational database management system (RDBMS) context:

1. The insert operation is a unary operation.
2. The select operation is a unary operation.
3. The join operation is a binary operation.
4. The update operation is a binary operation.

QUESTION 48

What language is used in the definition and manipulation of relational databases?

1. ANSI
2. SQL
3. ISO
4. RDB

QUESTION 49

Which of the following statements is TRUE?

1. A database management system (DBMS) defines, creates and maintains a database and allows controlled access to users.
2. A database is a collection of data that is always logically and physically coherent.
3. A DBMS is exclusively composed of software, data, users and procedures.
4. A DBMS has four levels: internal, conceptual, hierarchical and external.

QUESTION 50

What name is given to the person who has the maximum level of privileges and controls other users' access to a DBMS?

1. Database administrator
2. Expert user
3. End user
4. Technical administrator

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