Tutorial Letter 102/2/2020

Computer Organization and Architecture
COS2621

Semester 2

School of Computing

This tutorial letter contains Assignment 2 for Semester 2.

BARCODE

Define tomorrow.

UNISA | university of south africa

CONTENTS

1   INTRODUCTION

Dear student,

Because this is a blended online module, you need to go online to see your study materials and read what to do for the module. Go to the *myUnisa* website here: https://my.unisa.ac.za and login with your student number and password. You will see **COS2621-20-S1** (for the first semester) or **COS2621-20-S2** (for the second semester) in the row of modules in the orange blocks across the top of the webpage. Remember to also check in the -**more**- tab if you cannot find it in the orange blocks. Click on the module you want to open.

In addition, you will receive this tutorial letter and a printed copy of the online study materials from your module. While these printed materials may appear to be different from the online study materials, they are exactly the same and have been copied from the online *myUnisa* website.

2   Due dates of assignments

The table below gives the due dates of the assignments for this module.

1st semester

Assignment	Due Date	Unique number	Weight
1	18 August 2020	819647	30
2	22 September 2020	758093	70

3   Submission of assignments

To submit an assignment through *myUnisa*:

- go to *myUnisa*
- 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 that you wish to submit
- follow the instructions

PLEASE NOTE: Assignments can be tracked (e.g. whether or not the University has received your assignment or the date on which an assignment was returned to you) on *myUnisa*.

If you want to submit the assignment electronically and *myUnisa* is off-line during that time, you need not contact us, because we will be aware of it. Simply submit it as soon as *myUnisa* is available again.

Note the assignment unique number below – if you submit through *myUnisa* you will be asked to enter it. If you submit by post, please fill it in where it is requested on the mark reading sheet.

4   Assignment 2: 2nd semester

SUBMISSION: **PDF document** electronically via *myUnisa*.

DUE DATE	22 September 2020
UNIQUE NUMBER	758093

EXTENSION	There is NO extension for this assignment.
TUTORIAL MATTER	Chapters: Chapters 4, 5 & 13
CONTRIBUTION WEIGHT TO SEMESTER MARK	70

Question 1 – Multiple Choice
Please write down the number of the question followed by your selection. E.g.
1. a
2. b
…

Question 1 (written answers and a written program) **(70)**

Submit written answers for questions 1 to 3. All the questions will not necessarily be marked.

ASSIGNMENT 02 - SEMESTER 2

DUE DATE: 22 September 2020

SUBMISSION PROCEDURE: Written answers and a written program

UNIQUE NUMBER: 758093

WEIGHT: 70

STUDY MATERIAL: Guide 102:   Units 7, 8 & 9
                                                          Appendices A - F
                                                          (Use as references)

                                              Stallings: Chapters 4, 5 & 13

Submit written answers for questions 1 to 4. All the questions will not necessarily be marked.

Question 1 [10]

(a) The following table reflects the memory contents of a part of memory in a one-address machine with an accumulator:

Address	Contents
00	20
20	30
30	40
40	50
50	60
60	70

What values do the following instructions load into the accumulator?

LOAD IMMEDIATE 20

LOAD DIRECT 20

LOAD INDIRECT 20

(b)   Give examples of Intel x86 instructions in which the following addressing modes are used:

        Immediate addressing
        Direct addressing
        Stack addressing
        Indexed addressing
        Base-addressing
        Register indirect addressing

Question 2 [11]

(a) Briefly discuss the concepts of (i) error correcting-codes and (ii) error-detecting codes.

(b) What is the distinction between spatial locality and temporal locality?

(c) Briefly describe the cache organisation of the Pentium 4.

Question 3 [9]

(a) Explain why one type of RAM is considered to be analog and the other digital.

(b) What are the key properties of semiconductor memories?

(d) What is a parity bit?

Question 4 [50]

Design a program in assembly language to read a number entered by the user. The program should determine whether or not the number is divisible by 3 and display an appropriate message based on the results on the screen. The program should do the following:

Clear the screen and change the screen colour to *white on blue.*

Change the cursor position to row 10, column 0.

Prompt the user to key in the number (1 - 9).

Read the number from the keyboard.

Convert the number to a numeric value and store in memory. Test whether the number is in the range 0…9. Display '**' next to the number if the number is out of range and read again.

Divide the number by 3. If the remainder is equal to zero, we know that the number is divisible by 3, otherwise it is not.

If the number is divisible by 3, display the following message: 'Number is a multiple of 3' otherwise display the message 'Number is not a multiple of 3'.

Terminate the program.

The following is an example of what the program should do. The user input is displayed in *italics, i.e. 9 below.*

> Please enter the number you select: *8*
>
> *The number is not a multiple of 3*

NB: Submit three screen shots of different test runs performed.

Marks will be allocated as follows:

Clearing the screen and changing the screen colour	(3)
Changing the cursor position	(2)
Displaying the user prompt	(2)
Reading the number (ASCII character)	(2)
Converting the number to a numeric value	(2)
Testing the range and displaying an error message if the number is invalid	(4)
Calculation	(4)
A program listing submitted	(6)
Three screen shots of test cases submitted (3 × 5)	(15)
The program structure	(5)
The program documentation (comments)	(5)

Note: The first line in your program should be a comment line in which your student number and name are stated.

FAQ: How do I obtain a print-out of the text on the screen within a DOS window?

(Refer to section 9 of tutorial letter 101)

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