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Electronic Past Questions

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Designed by
#Sheygun
#Team Samdos

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2016/2017 HARMATTAN SEMESTER EXAMINATION

CSC 211 – PRINCIPLES OF COMPUTER ORGANIZATION 3 Units

Instruction: Answer any 4 questions

Time Allowed: 2hrs

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty

Question One (17.5 Marks)

- With the aid of a diagram, discuss the different levels of machines in the computer hierarchy (6 Marks)
- Define the following:
 - Stored Program (1.5 marks)
 - Processor Register (1.5 marks)
 - Instruction set (1.5 marks)
 - Memory address (1.5 marks)
- With the aid of a diagram, discuss the computer system bus model (5.5 marks)

Question Two (17.5 Marks)

- With the aid of a diagram, discuss the memory hierarchy of the computer system (6 marks)
- Differentiate between computer working memory and the secondary memory (4 marks)
- Describe the following character codes:
 - Binary Coded Decimal(BCD) (2.5 marks)
 - American standard Code for Information Interchange (ASCII) Extended Binary Coded (2.5 marks)
 - Extended Binary Coded Decimal Interchange Code (EBCDIC) (2.5 marks)

Question Three (17.5 Marks)

- Define processor register (2.5 marks)
- State the usefulness of the following registers (2.5 marks each)
 - Data register
 - Pointer register
 - Index register
- Describe the following mode of addressing: (2.5 marks each)
 - Register addressing
 - Memory addressing
 - Immediate addressing

Question Four (17.5 Marks)

- State the stages of instruction cycle in the chronological order (7 marks)
- Discuss the following instruction sets
 - RISC (4 marks)
 - CISC (4 marks)
- Discuss interleaved memory and its advantages (2.5 marks)

Question Five

- (i).Find the binary equivalent of $(23.8125)_{10}$. (2.5 marks)
(ii) Convert decimal number 755.9375 to its hexadecimal equivalent (2.5 marks)
(iii) Determine decimal equivalent of $(B14)_{16}$ (2.5 marks)
- Discuss in detail what pipelining is. (5 marks)
- Discuss the following:
 - Chip (2.5 marks)
 - Computer motherboard (2.5 marks)

Question Six

- Define logic gate (2.5 marks)
- Differentiate between a bit, byte and a word (3 marks)
 - DRAM
 - SRAM
- Write short note on: (3 marks each)
 - Access Time
 - Latency Time

LAGOS STATE UNIVERSITY, OJO

Department of Computer Science

2016/17 Rain Semester Examination

Course Code: CSC 213 Course Title: Introduction to Algorithms Time Allowed: 1.5 hours

Instruction: Answer Questions 1 and any other two (2)

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty

- 1a. Suppose that a decision problem Π is NP-complete. What does this fact tell you about the existence/nonexistence of an efficient algorithm to solve problem Π ? (5 marks)
- 1b. What is the feature of a problem that makes dynamic programming a good candidate for finding a solution? (5 marks)
- 1c. State whether each of the following is True or False (1 mark each). Explain your choice. (2 marks each)
- If a problem has an algorithm that is correct for $2/3$ fraction of the inputs, then it also has an algorithm that is correct for 99.9% of the inputs. (3 marks)
 - If a problem has a randomized algorithm that runs in time t and returns the correct answer with probability at least $2/3$, then the problem also has a deterministic algorithm that runs in time t and always returns the correct answer. (3 marks)
 - A perfect hash table that is already built requires 2 hash functions, one for the first level hash, and another for the second level hash. (3marks)
 - If Φ is a potential function associated with a data structure S , then 2Φ is also a potential function that can be associated with S . Moreover, the amortized running time of each operation with respect to 2Φ is at most twice the amortized running time of the operation with respect to Φ . (3 marks)
 - Every special case of an NP-hard problem is also NP-hard. (3 marks)
- 1d. Let $S_n > 2_n + 1$. Show that S_n is true for all n for which $n \geq 3$. (5 marks)
- 2a. What do you understand by Backtracking (4 marks)
- 2b. Name six (6) primitive operations that are used in determining the time complexity of any program (6 Marks)
- 2c. State four (4) properties of an Algorithm (4marks)
- 2d. (i) Give a classical example of the (i) Knapsack Problem (3 marks) (ii) N-queen's problem (3marks)
- 3a. Let $S = \{(x_1, y_1), \dots, (x_n, y_n)\}$ be a set of n points in a plane. You have been told that there is some k such that the points can be divided into k clusters with the following properties:
- Each cluster has radius r .
 - The center of each cluster has distance at least $5r$ from the center of any other cluster.
 - Each cluster contains at least qn elements.
- Your goal is to use this information to construct an algorithm for computing the number of clusters. Give an algorithm that takes as input r and q , and outputs the exact value of k . (8 marks)
- 3b. What do you understand by Hamiltonian Tour? (4 marks)
- 3c. What do you understand by a TRIE? Use relevant example to justify your discussions.(4 marks)
- 3d. What are the draw backs of Greedy Algorithm? (4 marks)
4. a. What does it mean when we say that a computer is a programmable device? (3 marks)
- 4b. Write a pseudocode algorithm to get three integers from the user and print them in numeric order. (6 marks)
- 4c. Different between P-class and NP- class problems using relevant examples (4 marks)
- 4d. Use relevant examples to differentiate between the worst case, average case and best case running time of an algorithm. (3 marks)
- 4e. Distinguish between pseudocode and pseudo-operations. (4 marks)
- 5a. What is a recursive algorithm? (5 marks)
- b. Write an Algorithm for finding the k -th even natural number. Note here that this can be solved very easily by simply outputting $2*(k - 1)$ for a given k . The purpose, however, is to illustrate the basic idea of recursion rather than solving the problem. (5 marks)
- c. What are the operations that exist in the Random access Machine Model? (4 marks)
- d. What is an Alphabet? (2 marks)
- e. What is the difference between effectiveness and efficiency of an algorithm (4 marks)

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2014/2015 HARMATTAN SEMESTER EXAMINATION

CSC 215 - STRUCTURED PROGRAMMING TIME ALLOWED: 1HR 30 MINS

Instruction - Answer Question 1 and Any Other Two (2) Questions**Question 1**

- What is the purpose of this VB statement: `ComboBox1.Items.Remove("Ipad")` [2 marks]
 - Write a VB statement to declare a variable name `firstnum` as an integer [2 marks]
 - Write a VB statement to declare a character variable called `yourname` as a string and allocate 10 spaces to store it [2 marks]
- Write out the output of the following VB statements [each carries 2 marks]
- `15 mod 4`
 - `Len("lagos state")`
 - `Right("lagos state",3)`
- Which of the following is not a valid variable name in VB `My_iphone, Ade.Adewale, _samsung, Computer123&BCH`
 - Write out the final value of sum in the VB programme segment below [2 marks]

`Dim sum, counter As Integer``Sum=0``For counter = 0 to 50 step 10``sum+=counter`

Next

- What is the range of a numeric data is of type Byte? [2 marks]

- What is the output of this VB expression: `2+4*3\5`

Question 2

- Write 4 subroutines for each of the buttons in the form below, such that when the buttons are clicked, the following actions are executed. (i) **Computer Adds** adds a new item to the list as a response to the click of the button. (ii) **User adds item** brings a form to allow the user to supply an item which is then added. (iii) **Computer Removes Item** removes the last item from the list. (iv) **User Removes item** brings a form to allow the user to remove an item from the list. [11 marks]



- (i) List the three main aspects of structured programming [3 marks]
(ii) Briefly discuss each of (i) above [6 marks]

Question 3

(a) Write out the answer of the following expression [2 marks each]

- i. Len("I was there when he came") + InStr(1, "Lagos State University", "State")
- ii. "The boy is "&Len("previous 2")&" year "&" old"
- iii. "The actor scored "&Len("following 2")&.points"
- iv. Microsoft.VisualBasic.Right ("Prof. Aribisala", 5)
- v. Mid(Aiyeniko, 2, 6).answer = iyenik

b.

- (i) State four rules to follow when naming the variables in Visual Basic [4 marks]
- (ii) List three major advantages and three disadvantages gained by structured programming [6 marks]

Question 4

- a. Write short notes on the following keywords in Visual Basic: Private, Static, Public, Event-Driven [2 marks each]
- b. Write a Visual Basic subroutine or program which prompts a user to supply names of 10 students, one at a time, and then stores the names in a list each time a name is entered. [6 marks].
- c. Using Pythagoras theorem, write a Visual Basic subroutine or program to calculate the length of hypotenuse 'c' given the length of the adjacent side 'a' and the opposite side 'b' [6 marks].

Question 5

- (a) List 10 useful common controls in VB toolbox that allow a programmer to develop a VB application [10 marks].
- (b) A student's letter grade is calculated according to the following schedule [10 marks].

Numerical grade	Letter grade
Greater than or equal to 80	A
Less than 80 but greater than or equal to 70	B
Less than 70 but greater than or equal to 60	C
Less than 60 but greater than or equal to 50	D
Less than 50	F

Using this information, write a Visual Basic programme that accepts a student's numerical grade and converts the numerical grade to an equivalent letter grade and displays the letter grade.

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2013/2014 HARMATTAN SEMESTER EXAMINATION

CSC 213 – INTRODUCTION TO ALGORITHM AND APPLICATION

Instruction: Answer any FOUR Questions

3 UNITS

Time Allowed: 2hrs

- 1a. Define the following terms
i) Algorithm ii) Pseudocode iii) Flowchart
b. What is meant by
i) Algorithm correctness ii) Efficiency of algorithm iii) Sorting problem
iv) Worst case efficiency v) Best case efficiency iv) Average case efficiency
c. Explain the “Order of growth”.

- 2a. Define “Divide and conquer” concept
b. Write a pseudocode for a divide and conquer for merging two sorted arrays in to a single sorted one. Explain with examples
c. Prove that

$$100n + 5 \in O(n^2)$$

- 3ai. Explain “recurrence” in line with “divide and conquer” paradigm
ii. List various methods for solving recurrences

- b. Solve the following recurrence reactions. Find an exact solution for $T(n)$:

i. $T(n) = T\left(\frac{n}{3}\right) + T\left(\frac{2n}{3}\right) + cn$

$$T(n) = T\left(\frac{n}{3}\right)$$

ii. $T(n) = 2T\left(\frac{n}{2}\right) + cn$

- 4a. With examples, explain the following

- i) NP problem ii) NP-Complete problem iii) NP-Hard problem

- b. When is a decision problem said to be Polynomially reversible?

- c. What is a Big O notation? Illustrate with an example

- ii. How will you represent the complexity of algorithm

- 5a. Define i) Binary tree and ii) Binary search; and identify (if any) the difference between them.

- b. What can you say about the average case efficiency of a Binary search?

- c. Describe how divide and conquer technique can be applied to Binary trees

- 6ai. What are Sequential algorithms?

- ii. What are Parallel algorithms?

- iii. What are Exact and Approximation algorithms?

- iv. What are Algorithm Design techniques?

- b. State the Euclid's algorithm for finding Greatest Common Divisor (GCD) of two given numbers

- c. What do you mean by “Amortized efficiency”?

LAGOS STATE UNIVERSITY, OJO, LAGOS
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
2014/2015 HARMATTAN SEMESTER EXAMINATION

CSC 213 – INTRODUCTION TO ALGORITHM AND APPLICATION (3UNITS)

Instruction: Answer Question 1 and any other THREE

Time Allowed: 2hrs

- 1a. Distinguish between a *polynomial algorithm* and an *exponential algorithm* [4 marks]
- ii. Write an algorithm each for finding the
- | | |
|----------------------------------|-------------|
| (i) total of n numbers | [2 marks] |
| (ii) average of n numbers | [2.5 marks] |
| (iii) square root of n numbers | [2.5 marks] |
| (iv) factorial of n numbers | [2.5 marks] |
- b. Draw the corresponding flowcharts of the algorithms [4 marks]
- 2a. Define the following terms (i). Algorithm, (ii) "Complexity of algorithm",
(iii) "Efficiency of algorithm" and (iv) "Order of growth" [4 marks]
- bi. Describe how flowchart may be related to designing a good and robust algorithm. [5 marks]
- ii. Discuss the symbols (at least 5) and rules for drawing a good flowchart. [5 marks]
- c. Enumerate various steps of development of an algorithm [3.5 marks]
- 3a. With good *algorithmic procedures*, describe the following sorting routines
- | | | | |
|-------------------|--|------------------|----------------|
| i. Insertion sort | ii. Merge sort | iii. Bubble sort | [4 marks each] |
| bi | Why is it necessary to have many sorting methods | | [2 marks] |
| ii. | Discuss a real world example that requires sorting | | [3.5 marks] |
- 4a. Write a pseudo code of the primitive *sorting* algorithm [4 marks]
- bi. By making use of a suitable algorithm based on a *bubble sort* technique, show how the following data would be manipulated into its final ascending order [7 marks]
- 7, 3, 9, 1, 4, 8, 5, 2
- ii. Apply *Quick sort* and *Shell sort* to the same data items (in 4bi) [6.5 marks]
- 5a. Use the technique of *Merge sort* to describe the principle of *Divide and conquer algorithm* [7 marks]
- bi. Describe Greedy algorithm for *Traveling Salesman Problem*. [8 marks]
- ii. Give any 4 examples of standard algorithm [2.5 marks]
- 6a. With examples, explain the following
- | | | | |
|----------------|--|-----------------------|----------------|
| (i) NP problem | (ii) NP-Complete problem | (iii) NP-Hard problem | [3 marks each] |
| b. | When is a decision problem said to be Polynomially reversible? | | [3 marks] |
| ci. | What is a Big O notation? Illustrate with an example | | [3 marks] |
| ii. | How will you represent the complexity of algorithm | | [2.5 marks] |

Time allowed 2hours.

Answer Question 1 and any other 3

- a. What are the similarities and differences between array processor and vector processor?
- b. In what sense are hardware and software equivalent? Not equivalent?
- c. What do you understand by loosely coupled and tightly coupled CPUs in a multiprocessor?
- d. Explain the differences between Instruction level parallelism and Processor level parallelism.
- e. Assume a 5-stage pipeline machine. Suppose the cycle time for this machine is 1usec. Then it takes 5usecs for an instruction to progress the 5-stage pipeline. What is the rate of processing in MIPS for this machine?
- f. Explain why SCSI is more than just a disk interface.
- g. Both keyboard and display monitor are not optional input devices. Why is the keyboard controller often on the motherboard and the display monitor controller is located on the plug-in board?
- h. Why was the PS/2 architecture not acceptable in the PC industry in spite of its faster bus than its predecessor IBM PC? Why was PCI one of PS/2 successor acceptable?
- i. Why do memories use error detecting/correcting codes? What are Codeword and Hamming distance? Explain briefly the significance of Hamming distance.
- j. Memories come in hierarchies. Name the hierarchies. Explain 3 key issues as we move up and down the hierarchy.

(Each question in (1) carries 4 marks totaling 40 marks.)

2. write short notes on the following:

- (i) Array processor (2)
- (ii) Vector processor (2)
- (iii) Multiprocessor (2)
- (iv) Multicomputer (2)

What are the similarities and difference amongst them? (2)

3. Consider a six level computer (0-Digital Logic; 1-Microarchitecture; 2-Instruction Set; 3- Operating System; 4- Assembly Language; 5-Problem Oriented Languages). Explain briefly, what takes place at each level. Why is it important that computers are designed this way? (10)

4. Discuss briefly with 5 points why cache design is becoming an increasing important subject for high performance CPU. (10)

5. Discuss the advantages and disadvantages of interpreter-based approach of computer processors. Explain the factors in favor of interpretation. (10)

6. Explain any five principles sometimes called RISC design principles. (10)

- a. IBM main frames were advertised as having both decimal and binary arithmetic. How did IBM achieve this? Illustrate with an example. (4)
- b. Assume two machines A and B with the following
 - (i) Machine A has memory with 2^{12} cells of 8bits
 - (ii) Machine B has memory with 2^{12} cells of 64bits

How many n-bit addresses would each computer require? (2)

What would be the sizes of each word and register in each computer? (2)

How many bits can an instruction manipulate at a time in each machine? (2)

LAGOS STATE UNIVERSITY, LAGOS, NIGERIA

FACULTY OF SCIENCES

DEPARTMENT OF COMPUTER SCIENCES

CSC 213 – INTRODUCTION TO ALGORITHM DESIGN AND APPLICATION

2009/2010 SESSION

HARMATTAN SEMESTER

TIME ALLOWED: 2HRS

INSTRUCTION: Answer question Number 1 and any other 3

1.
 - a. Give two reasons why it may be preferable to implement an $O(n^2)$ algorithm over $O(n)$ algorithm that solves the same problem.
 - b. Given a set of n numbers, we wish to find the i th largest in sorted order. One solution is to use the expected running time of the selection algorithm to find the i th largest number, partition around that number and sort the i th largest numbers (say, using merge sort). What is the running time in terms of n and i ? Explain your answer.
2.
 - a. Solve the recurrence equation of the worst -case Running Time using repeated substitution such that: $T(n) = T(n - 1) + n = On^2$
 - b. Given $g(n)$, what is $\Theta(g(n))$
3. Give asymptotically tight Big – O bounds for the following recurrence relation, justify your solution with the indicated method of solving the recurrence relation.
 - a. $T(n) = T(n-2) + 1$ use interactive method
 $T(n) = 1$ for $n \leq 2$
 - b. $T_n = 2T(n/2) + 1$ use induction method
 $T(1) = 1$
 - c. Show that $\log(n!) = \Theta(n \log n)$
- 4a. Define the followings:
 - i. Worst Case Time
 - ii. Satisfiability (SAT)
 - iii. Search problem
- b.
 - i. What are the stages involved in proving the correctness of an algorithm.
 - ii. When is the Sieve technique used?
5.
 - a. Let $f(n)$ and $g(n)$ be asymptotically non negative functions. Using the basic definition of Θ - notation, prove the $\max(f(n), g(n)) = \Theta(f(n) + g(n))$
 - b. Define a relation for the brute – force algorithm
(Hint: show dominance level)
 - c. Use the technique of divide and conquer to solve the merge (A, p, q, r)

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2015/2016 HARMATTAN SEMESTER EXAMINATION

CSC 215 - STRUCTURED PROGRAMMING TIME ALLOWED: 1HR 30 MINS
Instruction - Answer Question 1 and Any Other Two (2) Questions

- I i. What is the purpose of this VB statement? `ComboBox1.Items.Add("Android")` [3 marks]
ii. Write a VB statement to declare a variable name `awards` as an integer [3 marks]
iii. Write a VB statement to declare a character variable called `books` as a string and allocate 10 spaces to store it [3 marks]
iv. Write out the output of the following VB statements [each carries 3 marks]
v. $16 \bmod 5$ vi. `Len("Benjamin Aribisala")` vii. `Right("Kayode Aiyenikoko", 4)`
viii. Which of the following is not a valid variable name in VB? `My_iphone`, `Ade.Adewale`, `_samsung`, `Computer&BCH`

`Dim sum, counter As Integer`

`Sum=0`

For counter = 0 to 40 step 10

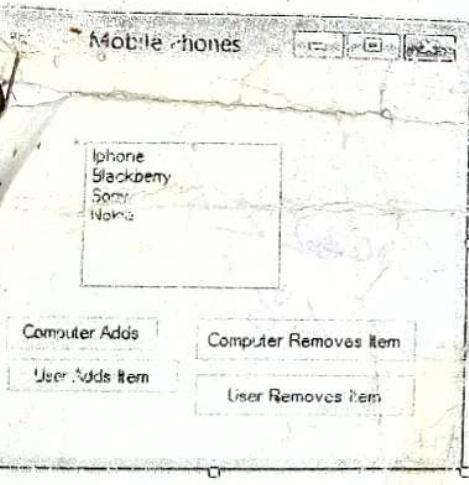
`sum+=counter`

Next

ix. What is the range of a numeric data that is of type Byte? [3 marks]

x. What is the output of this VB expression? $2+6*4\sqrt{ }$ [3 marks]

2 a. Write 4 subroutines for each of the buttons in the form below, such that when the buttons are clicked, the following actions are executed. (i) Computer Adds adds a new item to the list as a response to the click of the button. (ii) User adds item brings a form to allow the user to supply an item which is then added. (iii) Computer Removes Item removes the last item from the list. (iv) User Removes item brings a form to allow the user to remove an item from the list. [11 marks]



- b(i). List the three main aspects of structured programming [3 marks]
(ii) Briefly discuss each of (i) above [6 marks]

- 3 a. Write out the answer of the following expression [2 marks each]
i. $\text{Len}(\text{"LASU is the best University"}) + \text{InStr}(1, \text{"Lagos State University"}, \text{State})$
ii. "The boy is " & Len("brilliant") & " year " & " old"
iii. "The actor scored " & Len("following") & points"

iv. Microsoft.VisualBasic.Right ("Prof. Aribisala", 5) v. Mid(Aiyenikoko, 2, 6)

b. i. State four rules to follow when naming the variables in Visual Basic [4 marks]

ii. List three major advantages and three disadvantages gained by structured programming [6 marks]

4 a. Write short notes on the following keywords in Visual Basic: Private, Static, Public, Event-Driven [2 marks each]

b. Write a Visual Basic subroutine or program which prompts a user to supply names of 5 students, one at a time, and then stores the names in a list each time a name is entered [6 marks].

c. Determine the final value of sum in the program segment given below, show your calculations [6 marks]

`sum=0`

For k = 1 To 2

 For j = 1 To 3

 sum = sum + k * j

 Next j

Next k

i. (a) List 10 useful common controls in VB-toolbox that allow a programmer to develop a VB application [10 marks]

(b) How does branching differ from selection? [3 marks]

(c) Write a For-Loop structure to compute $1^2 + 3^2 + \dots + 19^2$ [7 marks]

Lagos State University, Ojo, Lagos

Faculty of Science

Department of Computer Science

2015/2016 Rain Semester Examination

CSC 228- Software Practise Time Allowed: 1:45 minutes

Instruction: Answer all questions in Section A and any two in Section B

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty

Name: ADEKUNLE AMINAT -A Matriculation Number: 140561008

SECTION A

- What is the purpose of implicit none? [3 marks]
- What value of i will be returned in the expression below; given that a = 1.0, b = -5.0, c = 6.0
 $i = \lfloor 1.0 + \sqrt{b^2 - 4.0 * a * c} \rfloor / (2.0 * a)$ [3 marks]
- What is the difference between a Function and a Subroutine? [4 marks]
- What is the difference between PRINT and WRITE? [4 marks]
- Determine the final value of k below [3 marks]

```
k = 2
do j = 3,8,2
  k = k + j
end do
k = 2 * k
```

- Which of the following are non-executable?

```
x = y + z
real x,y
! sample program
```

- Determine the Fortran equivalent of $y = |x^3 - 3x + 4| - \sin(3t + e^y)$ [4 marks]

- Write a subroutine Ticket(Age, Price) that performs the following task:

Argument Age, representing the age of a person visiting a zoo, is passed into the subroutine. The subroutine computes a ticket price according to the rules below and passes the price back as the argument Price.

- the ticket is free for ages less than 6
- the ticket price is 30000 Naira for ages 6 to 12 [6 marks]

- the ticket price is 30000 Naira for ages 6 to 12

SECTION B

- Suppose x, y, z are the following functions of t: $x = t^3 - 8t + 4$, $y = \sin t + \cos 2t$, $z = e^{0.5t}$ respectively. Write a program which reads in t and prints x, y, z [10 marks]

- The annual repayment, A, on a loan, L, is given by:

$$A = \frac{L}{(1+i)^N} + L \quad \text{where } i \text{ is the annual interest,}$$
$$(1+i)^N - 1 \quad \text{N is the loan period in years.}$$

Write a FORTRAN program to input I, N and L, and output the annual repayment and the total repayment after N years. Using the values $I = 15\%$, $N = 3$ years, $L = 1000$ Naira, verify that your program works correctly [10 marks]

- Write a complete Fortran program that reads in two input values. The first value read in is a real number R, and represents the radius of a circle. The second value is a character, CHAR, and is used to determine if the program should calculate and output the circumference of the circle with radius R, the area of the circle with radius R, or the diameter of the circle with radius R. (If the user types 'C' for CHAR, calculate the circumference; if the user types 'A', calculate the area; if the user types 'D', calculate the diameter). You do not have to comment the program. The program does not have to recover from errors in user input. Use the value 3.14159 for pi.

Formulae: circumference = $2 * \pi * \text{radius}$
area = $\pi * \text{radius}^2$
diameter = $2 * \text{radius}$ [15 marks]

- Write a program to store a list of 4 numbers each in arrays x and y, add each element of x to corresponding element of y. Print the elements of arrays x and y as well as their sum. [5 marks]

- The following FORTRAN 90 program inputs the speed (m/s) and mass (kg) of a body, and outputs the body's momentum. Underline your addition

```
REAL :: V, M, P
READ *, V, M
P = M * V
PRINT *, "Momentum is ", P
END
```

- Modify the program so that it also outputs the body's kinetic energy (half times mass times the velocity-squared). [5 Marks]
- After your modification what is the output for the input values

$V = -4.0$ and $M = 3.2$ [5 Marks]

- Write a program using a loop which gives a Celsius to Fahrenheit conversion table in units steps from 0°C to 100°C. (To get degrees "F, multiply "C by 9/5, then add 32; to check your result, note that water freezes at 32°F and boils at 212°F.) [10 Marks]

LAGOS STATE UNIVERSITY, NIGERIA

DEPARTMENT OF COMPUTER SCIENCE

COURSE TITLE: Information management system COURSE CODE: CIC 224

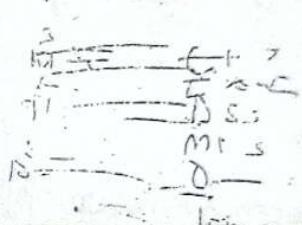
INSTRUCTIONS: Answer any four TIME ALLOWED: 90 mins

Question 1

- a. What is a system? What are the nine characteristics of a system and explain how they are related?
- b. Define system analysis and design.
- c. Describe the role of the system analyst in information system development.
- d. State and explain the three types of information system.
- e. Describe the information system development life cycle SDLC

Question 2

- a. Explain the level of management in an organization
- b. Explain 3 reasons why systems need to be enhanced
- c. What is management information system?
- d. Explain 5 potential benefits of investing in Management information system
- e. What is disk access time? Explain its 3 component



Question 3

- a. What is file organisation?
- b. Explain the four basic method of organising files on disk →
- c. How can (b) be accessed?
- d. Explain the following terms
- i. Cylinder
 - ii. Track
 - iii. Block
 - iv. Bucket
- e. Distinguish between hard-sectoried disk and soft-sectoried disk

Question 4

- a. What is a data structure
- b. Explain the following
- i. Arrays
 - ii. Strings
 - iii. Queues
 - iv. Stacks
 - v. Trees
- c. What are the advantages can a list have over a simple strings or tables? Make reference to data storage within main store to illustrate your answer.

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2014/2015 RAIN SEMESTER EXAMINATION

COURSE TITLE
INSTRUCTION
TIME ALLOWEDASSEMBLY LANGUAGE PROGRAMMING (CSC 222)
ANSWER QUESTION I AND ANY OTHER TWO
TWO HOURS

COURSE UNIT: TWO

SECTION A

(1) State three

✓ (i.) comparisons between Assembly Language and High Level Language.

(3 Marks)

✓ (ii.) advantages of assembly language over machine language.

(3 Marks)

✓ (iii) common differences between compiled and assembled languages

(3 Marks)

Justify the statement "Stack computer consists of an operation code only with no address field".

(5 Marks)

Write short notes on Instruction Set Architecture (ISA).

(3 Marks)

d. Write the equivalent binary digits for the following:

i) 76C46DF9_{hex} ii) E5B9C7A0_{hex} iii) FEB38DCB2_{hex}

(3 Marks)

e. What is the minimum number of binary bits needed to represent each of the following unsigned decimal integers?

i) 4095. ii) 65534. iii) 2134657

(3 Marks)

f. Differentiate between:

i). Bit, Nibble and Byte

(3 Marks)

✓ (ii). Most significant bit (msb) and least significant bit (lsb)

(2 Marks)

g. What are the drawbacks of sign-magnitude representation and 1's complement representation?

h. What are the ranges of the following integers in *unsigned* and *signed* representation?

i) 8-bit, ii) 16-bit, iii) 32-bit and iv) 64-bit

(8 Marks)

i. Write the Assembly Language codes to represent the expression: $X = 7 * 7 * (Y + 9)$.

(4 Marks)

SECTION B

(2a) Suppose AX = 1234_h and BX = FFFF_h. What is the result of the following assembly language instruction?
AND AX, BX

(4 Marks)

✓ b. Explain why modern computers use Hexadecimal numbering system

(2 Marks)

✓ c. i. Write the Assembly Language code for the following expression

(3 Marks)

sum = num1 + num2;

ii. If num1 = 12 and num2 = 34, show the results of an addition operation

(2 Marks)

d. Given that x = y++ and x = ++y;

i) Explain the difference between the two statements.

(1 Mark)

ii) Implement them in Assembly Language.

(2 Marks)

iii) Give an example to show the results of (di).

(1 Mark)

15 ✓ a. What are registers?

(2 Marks)

b. Explain CMP instruction.

(3 Marks)

✓ c. Describe five (5) addressing modes available of a microprocessor you have studied

(10 Marks)

15 (4a) Explain the following instructions:

i) MOV CX, CS -

68 16 8 0

(2 Marks)

ii) MOV AX, [ALPHA]

24 10 1 0

(2 Marks)

iii) XCHG BX, CX -

1 1 1 1

(2 Marks)

b. Indicate the different types of arithmetic instructions possible with 8086.

(2 Marks)

c. Explain the PUSH and POP instructions, and their allowed operands.

(2 Marks)

(7marks)

68 16 8 0

24 10 1 0

1 1 1 1

15 Sa. Convert (10111.011)₂ to decimal number.

(4 Marks)

b. Suppose AX = 1357_h and BX = 2468_h. What is the result of the following assembly language instruction?

OR AX, BX

(4 Marks)

c. Using order of operations from C Language, convert the following arithmetic statement into

the equivalent Assembly Language code.

 $v = -w + x * y - z++;$

Discuss briefly the basic structure of 8086 computer processors.

(4 Marks)

(3 Marks)

immediate

Register

Direct

Indirect

Indexed

left addressable
machine imm1mov ebx 7
add ebx 9
imul 7
imul 7

mov x ebx

mov ebx 7
imuladd ebx 9
imul 7
imul 7

mov x ebx

A

B

C

D

E

F

LAGOS STATE UNIVERSITY, OJO, LAGOS
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
2015/2016 RAIN SEMESTER EXAMINATION

CSC 222 – ASSEMBLY LANGUAGE PROGRAMMING, 2 UNITS

INSTRUCTION: answer question one and any other two. TIME: 1HR 30MINS

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty

/a. what is Assembly Language? [2marks]

/b. State 6 advantages of assembly language [6marks]

/c. What are the four steps involved in creating and running executable programs in assembly language? [6marks]

-d. Use the set of instructions below to answer the following questions [16mks]

```
.386
.model flat, stdcall
option casemap :none
include \masm32\include\windows.inc
include \masm32\include\kernel32.inc
include \masm32\include\masm32.inc
includelib \masm32\lib\kernel32.lib
includelib \masm32\lib\masm32.lib
.data
HelloWorld db "Hello World!", 0
.code
start:
invoke StdOut, addr HelloWorld
invoke ExitProcess, 0
end start
```

/i. What does .386 stands for?

/ii. What does .model flat, stdcall means?

iii. What is the function of the following include files?

```
"include \masm32\include\windows.inc
include \masm32\include\kernel32.inc
include \masm32\include\masm32.inc"
```

/iv. .data means what?

/v. .code means what?

/vi. Why .start?

2.a. Write an assembly program for finding the largest number in an array of 20 elements [8marks]

b. Differentiate between ADDR and OFFSET. illustrate using examples [6marks]

* 3. a. Explain three steps of addressing data in the memory [6marks]

3. a. Rewrite the instruction below using invoke function

```
push 0
push 0
push WM_CLOSE
push [hWnd]
call [SendMessage] [4mks]
```

b.i. What are strings? [2mks] ii. Write MASM code that copies a string [6mks]

c. State and give an example each of several ways MASM can be used to access data [8mks]

4.a. Write a program in MASM that reads the contents of "c:\exam.txt" and outputs in a MessageBox [8marks]

5.b. What are registers? [2mks] ii. Name and describe 8 32-bits general purpose registers [8mks] iii. Name and describe 4 16-bits segment registers [2mks]

5.a. Convert 8CD₁₆ TO binary equivalent [4mks]

5.b. Subtract 42 from 53 using two's complement [4mks]

c. What is a variable? [2mks] ii. Which part of the program is it declared? [2mks] Give the general format. [2mks]

d. Write a MASM program to add two numbers [6mks]

Lagos State University, Ojo, Lagos

Faculty of Science

Department of Computer Science

2015/2016 Rain Semester Examination

C 228- Software Practise Time Allowed: 1:45 minutes

Instruction: Answer all questions in Section A and any two in Section B

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty

Name: _____ Matriculation Number: _____

SECTION A

- What is the purpose of implicit none? [3 marks]
- What value of r will be returned in the expression below: given that a = 1.0, b = -5.0, c = 6.0
 $r = (-b + \sqrt{b^2 - 4.0 * a * c}) / (2.0 * a)$ [3 marks]
- What is the difference between a Function and a Subroutine? [4 marks]
- What is the difference between PRINT and WRITE? [4 marks]
- Determine the final value of k below [3 marks]

```
k = 2
do j = 3,8,2
  k = k + j
end do
k = 2 * k
```

- Which of the following are non-executable?

```
x = y + z
real x,y
! sample program
```

- Determine the fortran equivalent of $y = [x^3 - 3x + 4] - \sin(3t) + e^{it}$ [4 marks]

- Write a subroutine Ticket(Age, Price) that performs the following task:

Argument Age, representing the age of a person visiting a zoo, is passed into the subroutine. The subroutine computes a ticket price according to the rules below and passes the price back as the argument Price.

- the ticket is free for ages less than 6
- the ticket price is 60000 Naira for ages over 12
- the ticket price is 30000 Naira for ages 6 to 12

SECTION B

- Suppose x,y,z are the following functions of t: $x = t^2 - 8t + 4$, $y = \sin t + \cos 2t$, $z = e^{it}$ respectively. Write a program which reads in t and prints x, y, z [10 marks]

- The annual repayment, A, on a loan, L, is given by:

$$A = \frac{L}{(1+i)^N} + iL \quad \text{where } i \text{ is the annual interest.}$$

$(1+i)^N - 1$ N is the loan period in years.

Write a FORTRAN program to input i, N and L, and output the annual repayment and the total repayment after N years. Using the values $i = 15\%$, $N = 3$ years, $L = 1000$ Naira, verify that your program works correctly [10 marks]

- Write a complete Fortran program that reads in two input values. The first value read in is a real number, R, and represents the radius of a circle. The second value read in is a single alphanumeric character, CHAR, and is used to determine if the program should calculate and output the circumference of the circle with radius R, the area of the circle with radius R, or the diameter of the circle with radius R. (If the user types 'C' for CHAR, calculate the circumference; if the user types 'A', calculate the area; if the user types 'D', calculate the diameter). You do not have to comment the program. The program does not have to recover from errors in user input. Use the value 3.14159 for pi.

Formulae: circumference = $2 * \pi * \text{radius}$
area = $\pi * \text{radius}^2$
diameter = $2 * \text{radius}$ [15 marks]

- Write a program to store a list of 4 numbers each in arrays x and y, add each element of x to corresponding element of y. Print the elements of arrays x and y as well as their sum. [5 marks]

- The following FORTRAN 90 program inputs the speed (m/s) and mass (kg) of a body, and outputs the body's momentum. Underline your addition

```
REAL :: V, M, P
READ *, V, M
P = M * V
PRINT *, "Momentum is ", P
END
```

- Modify the program so that it also outputs the body's kinetic energy (half times mass times the velocity squared). [5 Marks]

- After your modification what is the output for the input values

V = 4.0 and M = 3.2 ?

[5 Marks]

- Write a program using a loop which gives a Celsius to Fahrenheit conversion table in units steps from 0°C to 100°C. (To get degrees F, multiply °C by 9/5, then add 32; to check your result, note that water freezes at 32°F and boils at 212°F.) [10 Marks]

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

COMPUTER SCIENCE DEPARTMENT

COURSE CODE: CSC 220 COURSE TITLE: DATA STRUCTURES 1

SECTION: 2014/2015

TIME: 2HR

UNITS: 3

INSTRUCTION: ANSWER ANY FOUR QUESTIONS

*L = L + 1
whole (A[i]) {
 Process (A[i]);
 i = i + 1
} End while*

1.a. Define the following with examples:

i. Data structure (2 MARKS) ii. Data types (2 MARKS) iii. Abstract data type (2 MARKS)

b. An array been a data structure, write an algorithm that can be used to traverse an array data structure (4.5 MARKS)

c. An array A[-15..64] is stored in a memory whose starting address is 459, if the word size for each element is 2, find the following:

i. how many number of elements are there in the array? (2 MARKS)

ii. What is the location for A[40] in the memory? (2 MARKS)

iii. find the location of the 20th element (3 MARKS)

$$\begin{array}{r} 11 \\ 459 \\ -28 \\ \hline 17 \\ 17 \\ -38 \\ \hline 9 \\ 9 \\ -97 \\ \hline 0 \end{array}$$

2.a. Explain the major difference between an array data structure and linked list data structure (4 MARKS)

b.i. Highlight the representations of a linked list in the memory (2 MARKS) *Static* *Dynamic*

ii. Identify the preferred representation and explain why it is preferred. (3 MARKS) *Dynamic* *becos it uses less memory space*

c.i. Write an algorithm to traverse a single linked list (2.5 MARKS)

ii. Explain the difference between a single linked list and a circular linked list (3 MARKS)

iii. Which of these two linked list is preferred in terms of data structure. Buttress your point with facts. (3 MARKS)

3.a.i. Explain the term stack (2.5 MARKS)

b.i. Write an algorithm to push an item onto the stack (3 MARKS)

ii. Pop an item from the stack (3 MARKS)

c. Given an empty stack 'S', show the state of the stack after each of the following operations.

N.B. The size n of the stack is 5 (6 MARKS)

i. PUSH A,B ii. PUSH C,D iii. POP iv. PUSH E,F v. PUSH G vi. POP

d. Highlight three applications of a stack (3 MARKS)

4:a.i. Explain the difference between a stack and a queue. (3 MARKS)

ii. Highlight four queue structures. (2 MARKS)

iii. Explain each of the queue structures listed above. (4 MARKS)

b.i. To avoid the restriction posed when the queue is partially full (i.e. when the rear = N and position 1... on the queue is free), what is the suitable queue structure. (1 MARK)

*- Ronald Robin Algorithm
- Simulation
- C.P.U Scheduling*

LAGOS STATE UNIVERSITY, NIGERIA
DEPARTMENT OF COMPUTER SCIENCE

COURSE TITLE: Information management system **COURSE CODE:** CSC 224
INSTRUCTIONS: Answer Question 1 and any other 3 **TIME ALLOWED:** 90 mins
SESSION: 2010/2011 Rain Semester

Question 1

- a. Explain the implementation of following:

 - Stacks - ~~FIFO~~ LIFO
 - Queues - ~~FIFO~~ LIFO
 - List

- Gunks

- Explain 3 reasons why systems need to be enhanced

Gmks

- b. Explain 3 reasons why systems need to be automated.
 c. A clerk, in assessing the amount of discount allowed on a customer's order is required to comply with the following policy:

"Any order of \$500 or more received from a credit-worthy customer attracts a discount of 5%, and, similarly, orders of less than \$500 attract a discount of 3%. Other circumstances must be referred to the supervisor for a decision."

- d) supervisor for a decision.
 Illustrate the above policy in the form of a decision table. 8mks
 Explain 5 potential benefits of investing in Management information system. 5mks

Q Question 2

- Question 2**

 - What is a system? What are the characteristics of a system and explain how they are related?
 - Define system analysis and design.
 - Describe the role of the system analyst in information system development.
 - State and explain the three types of information system.
 - Describe the information system development life cycle.

Q3 Question3

- a. What is file organisation?
 - b. Explain the four basic method of organising files on disk
 - c. How can (b) be accessed?
 - d. Distinguish between the behaviour of a stack and a queue
 - e. Distinguish between a bubble sort and Quicksort

~~ink~~ Question 4

- Question 4**

 - a. Define an abstract data type and discuss its role in algorithm development.
 - b. Explain array-based implementation with example.
 - c. Differentiate between array-based implementation and linked implementation.
 - d. What are basic list operations?
 - e. What is sorting? Explain how selection sort works.

Question 5

- Question 5

 - What is decision table. What are guidelines to developing decision table
 - The unit price of a particular product is N15 if less than 10 are purchased, N14 if between 10 and 49 are purchased and N13.80 if 50 or more are purchased. If the customer also has preferred customer status, then the purchase is subject to discount of 10%. Construct a decision table for this policy.
 - Write short on the following.
 - Problem
 - Opportunity
 - Directive

Deed

LAGOS STATE UNIVERSITY, OJO
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
SECOND SEMESTER 2013/2014 SESSION
B.Sc. EXAMINATION

CSC 224 - Introduction to Information Processing Methods

INSTRUCTION: Answer ALL questions in Section A and TWO questions in Section B

TIME ALLOWED: 2 Hours

SECTION A (Answer all questions)

1. Information is collection of fact which must be managed as carefully in any organization.
2. A system is interaction and interdependent component for Computer System.
3. A system analyst facilitate the development of and
4. Personal qualities helpful to system analyst are and
5. Three levels of management in an organization are and
6. The basic unit of data storage is byte.
7. Other units of data storage which are multiples of bytes are Kilo, Mega, Giga, Tera and Pico.
8. Primary memory are classified into RAM and ROM.
9. Two of the distinct parts of generalized system architecture are Data and Information.
10. Data is raw fact.
11. Data is encoded by assigning a knowledge to each character, digit, or multimedia object.
12. Three methods of file organization are Sequential, Direct and Index Sequential.
13. File system is an improvement on database system. (a) True (b) False (c) Undecided
14. An Information System basically carries out three basic function Data, Knowledge and Information.
15. Expert system is an artificial partner to the human expert.
16. Components of Expert system are and
17. Student CGPA (Cumulative Grade Point Average) is an information to the student.
18. Knowledge base of an Expert system is composed of and
19. Sorting is the rearrangement of data in either ascending or descending order.
20. Data structure: This is the arrangement of data in a manner meaningful so that it can be used effectively.

SECTION B (Answer any TWO questions)

QUESTION ONE

- a. Discuss the relevance of Management Information System (MIS) in an organization.
- b. Write short note on the following:
 - i. Sequential file organization.
 - ii. Direct file organization
 - iii. Index-sequential file organization

QUESTION TWO

- This is the rearrangement of data in
- a. What is sorting? Of ascending and descending sorts
 - b. Briefly describe the following:
 - i. Selection sort: This is the rearrangement of data in ascending or descending order.
 - ii. Quicksort: This is the rearrangement of data in ascending or descending order.

QUESTION THREE

- a. Expert system is an artificial partner to the human expert. Yes or No: Discuss
- b. Describe briefly the components of Expert system:

LASU, Abuja
Department of Computer Science
2011/2012 Rain Semester Examinations

Course Title: Introduction to Information Processing Methods

Course Code: CSC 224

Course Unit: 3C

Instruction: Answer any four (4) questions

Time Allowed: 2hrs

Q1. (a) Explain information system

(b) Briefly describe the relationships between computer science and information system

(c) Highlight the roles of a system analyst in an information system

Q2. (a) With the aid of diagram list the types of information system and the levels of management.

(b) State the level of management that each of the information systems fits into.

(c) Explain each of the information systems listed above stating the application area, advantages and disadvantages of each

Q3. (a) i. List the record access methods

ii. What determines record access methods

iii. Explain each of the method above

(b) i. Highlight the type of file organization

ii. Explain each of the organization method listed above

iii. State the suitable record access for each of the file organizations listed above

Q4. (a) Explain the relationship between date type and data structure

(b) What is the difference between a stack and a queue

(c) Enqueue (Q, 4), Enqueue (Q, 1) Enqueue (Q, 3), Dequeue (Q), Enqueue (Q, 8) and Dequeue (Q) on an initially empty queue Q stored in an array Q(1..6)

(d) Explain the concept of garbage collection.

Q5. (a) i. Explain how binary search tree works

ii. What is the relationship between basic operation time of BST and its height?

(b) For the set of (1, 4, 5, 10, 16, 17, 21) of keys, draw binary search tree of height 2, 3, and 4

(c) Write a procedure for tree search

it is k head
if left null and k-key < all
return k value
else return left

Q6. (a) i. Define decision tables

ii. List four application areas of a decision table

(b) A technical support company writes a decision table to diagnose printer problem base on symptoms describe to them over the phone from their Client. Using the rules below, construct a decision table showing all possible combination of alternatives.

Conditions: 1. Printer does not print

2. A red light is flashing

3. Printer is not recognized

4. Check the power cable

5. Check the printer-computer cable

6. Ensure printer/software is installed

7. Check replace ink

8. Check for paper jam

Actions: 1. Check the power cable

2. Check the printer-computer cable

3. Ensure printer/software is installed

4. Check replace ink

5. Check for paper jam

Decision points:

LAGOS STATE UNIVERSITY, OJO, LAGOS
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
2014/2015 RAIN SEMESTER EXAMINATION

CSC 224 – INTRODUCTION TO INFORMATION PROCESSING METHODS

Instruction: Answer Question 1 and any other Two (2) questions
Time Allowed: 1hr 30 min

Question One (30%)

- a. i. Define file index (2 marks)
- ii. Explain disc allocation strategies (2½ marks)
- b. i. Explain the methods of keeping track of available blocks and disks (3 marks)
- ii. Indicate the strengths and weaknesses of these methods (2½ marks)
- c. Given a disk with 5 tracks and 12 sectors each, the following specifies the allocated blocks in the memory:

Track	Sectors	values
0	2,7,8	4,3,5
1	0,5,6,9	2,7,14,1
2	4,5,10	11,3,5
3	0,1,2,7	4,5,1,7
4	4,5	3,5

- i. Represent the above diagrammatically, using the appropriate allocation strategy (10 marks)
- ii. Using any disk tracking method of your choice, keep track of the disk represented above based on blocks of memory. (10 marks)

Question 2 (20%)

- a. i. Define sorting (2 marks)
- ii. Define and Differentiate between internal and external sorting (2½ marks)
- b. Indicate if sorting is useful for the following processes or not:
 - i. Report generation (1 mark)
 - ii. Minimizing the storage needed (1 mark)
 - iii. Making searching easier and efficient (1 mark)
 - iv. Responding to queries easily (1 mark)
- c. i. The way a card game player arranges his card as he picks them up one by one is an example of which sorting technique. (1 mark)
- ii. State the steps involved in the sorting technique picked above and state when such a sorting technique is most suitable (4 marks)
- d. Sort the following numbers:
 8,22,7,9,31,19,5,13
 - i. Using bubble sort, show how swapping occur in each pass, considering sorting in ascending order. (5 marks)
 - ii. What is the number of swapping needed to sort the list above in ascending order. (1½ marks)

Question 3 (20%)

- a. Define the following: (8 marks)
- (i) Binary tree (ii) Full binary tree (iii) Complete binary tree (iv) Vertex
 - (v) Parent (vi) Child (vii) Edge (viii) Degree
- b. (i) Draw the tree with the string notation: (6 marks)
- (A(B(C(E),F,D), G(H,(I(J))))))
- (ii). What is the height of this tree? (1 $\frac{1}{2}$ mark)
- (iv) What type of tree is the tree above (1 $\frac{1}{2}$ mark)
- (v) Traverse the tree above using preorder traversals (3 marks)

Question 4 (20%)

- (a) Draw the architecture of Expert system (4 marks)
- (b) Explain how Expert system is an artificial partner to the human expert (4 marks)
- (c) Explain four factors that could make the staff members of an organization not to adopt and use an expert system developed for their services. (6 marks)
- (d) With the aid of a diagram, explain the pyramidal structure of organization management vis-à-vis the flow of information among the management. (6 marks)

Question 5 (20%)

- a. Discuss why Management Information System (MIS) should be user-centric (5 marks)
- b. Discuss the components of MIS (5 marks)
- c. At every stage of MIS development, MIS developers should involve the end users of the MIS. Discuss any two challenges that the MIS developers may have in this case. (5 marks)
- d. With the aid of diagrams, discuss the following types of system
 - i. Open system (2 $\frac{1}{2}$ marks)
 - ii. Closed system (2 $\frac{1}{2}$ marks)

- ii. Why is the queue structure preferred. (1.5 MARKS)
- c. Given a circular queue of length=4, indicate the state of the queue after processing each of the following operations. (6 MARKS)
- | | | | |
|--------------|---------------|----------------|-----------------|
| i. Enqueue A | ii. Enqueue B | iii. Enqueue C | iv. Enqueue D |
| v. Dequeue | vi. Enqueue E | vii. Dequeue | viii. Enqueue F |
| ix. Dequeue | x. Dequeue | xi. Dequeue | xii. Dequeue |

5.a. Define: i. Tree (1 MARK) ii. Leaf (1 MARK) iii. Height (1 MARK)

b.i. Explain the term binary tree. (2 MARKS)

Proof that the following properties holds for a binary tree:

- ii. The maximum number of nodes on level l is 2^l , where $l \geq 0$. (2 MARKS)
 - iii. The maximum number of nodes possible in a binary tree of height h is $2^h - 1$. (2 MARKS)
 - iv. The minimum number of nodes possible in a binary tree of height h is h . (2 MARKS)
- c.i. Highlight the various ways in which a tree can be traversed. (1.5 MARKS)
- ii. Explain each of the traversal methods listed above. (3 MARKS)
- iii. Write an algorithm for any of the traversal methods listed above. (2 MARKS) N.B. Use binary tree as a case study.

6.a.i. Explain the term sorting. (1 MARK)

ii. Indicate the state of the following set of numbers after each swap of a bubble sort algorithm:
8, 22, 7, 9, 31, 19, 5, 13 (3 MARKS)

iii. Write an algorithm for the above. (3 MARKS)

b.i. Explain your position about the importance of sorting and searching in computing. (2 MARKS)

N.B. Explain in terms of its cruciality

ii. Explain the following searching techniques: -Linear search -Binary search (3 MARKS)

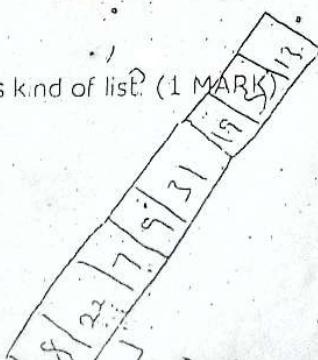
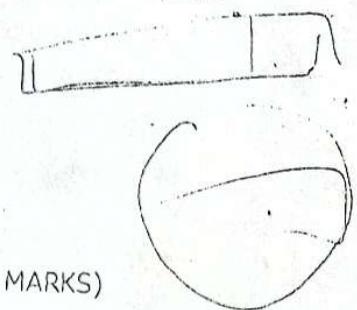
iii. What circumstance is binary search most applicable to. (1 MARK)

c.i. Given a list of ten names, what is the most suitable searching technique for searching this kind of list? (1 MARK)

ii. Why is it the most suitable for this list. (1 MARK)

iii. Write the algorithm for the searching technique. (2.5 MARKS)

Adele	funke	sola	Cynthia	Tore
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CSC 226 – OBJECT ORIENTED PROGRAMMING Instruction: Answer Question 1 and other ~~three~~ (2) questions
Time Allowed: 2hrs

Question 1 (30 Marks)

- (i) What is the significance of identifier in C++ program (4 marks)
(ii) List four rules to be followed while forming Identifiers (4 marks)
- (I) Define a function and list four advantages it offers (2½ marks)
(ii) Differentiate between the following:
(1) Formal argument and actual argument (2 mark) (2) Scope of a variable and lifetime of a variable (2 mark)
- What is the output of the C++ program below (3½ marks)

```
Int main(void)
{
    int a = 7, b = 8;
    cout << t++ << t+ << a++;
    cout << k << k++ << a+
    return (0);
}
```

- Write a C++ program to find the value of S (i.e. the distance travelled by an object) using the formula

$$S = U*T + 0.5 * A * T^2$$

Where: U = Initial velocity; T = Time taken; A = Acceleration (12 marks)

QUESTION 2 (20 Marks)

- Identify whether the following are valid or invalid identifiers in C++ [5 marks].
i. float ii. double iii. _count iv. myFirstProgram v. 4uonly
- Write a C++ program to compute the largest of 2 numbers and largest of 3 numbers using function overloading and conditional operator [15 marks]

Question 3 (20 Marks)

- Describe the structure of C++ program (3 marks)
- Define (i) Local Variable (ii) Global variable (3 marks)
- Explain the following different types of errors:
i. Compile-time error (1½ marks) ii. Linker errors (1½ marks) iii. Runtime errors (1½ marks)
iv. Logical errors (1½ marks)
- What will be the output of the following complete C++ program: (8 marks)

```
Int main (void)
{
    Int l;
    For (l = 1; i < n; i++)
    {
        g = i + 2;
        cout << g
    }
    Return 0;
}
```

QUESTION 4 (20 Marks)

- Explain the following concepts of object oriented programming
i. Object (3 Marks) ii. Class (3 Marks) iii. Data encapsulation (3 Marks) iv. Inheritance (3 Marks)
v. Polymorphism (3 Marks)

- Given that a = 4, b = 3, c = 7, d = 2, e = 5, p = 5.0 and that m**n represents m to the power of n
Evaluate the following arithmetic expression (5 Marks)

$$\text{i. } a + b * c / d - a ** d / e + b ** b \quad \text{ii. } c ** d - b * a / p + b$$

QUESTION 5 (20 Marks)

- Differentiate between structure data type and classes (3 Marks) ii. Define an Array (2 Marks)
iii. Declare a structure data called staff with member data staff number, staff name, staff age and staff salary (6 Marks)
- Write the syntax, in C++, for each of the following statement structures (10 marks)
i. If else statement structure ii. While structure iii. do while structure iv. For loop structure

FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
2016/2017 HARMATTAN SEMESTER EXAMINATION

CSC 222 – ASEEMBLY LANGUAGE PROGRAMMING

2 UNITS

Instruction: Answer Question 1 and any other two (2) questions

Time Allowed: 2HRS.

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty

- 1.** a. State two advantages and two disadvantages of a low-level programming language [4 marks]
b. If $X_2 = BADED_{16} = Y_8$, find $(X+Y)_{10}$. [6 marks]
c. Write short notes on the following:
 (i) ASCII encoding (ii) BCD encoding (iii) EBCDIC encoding [6 marks]
d. Convert the following base ten numbers to their equivalent 2's complement
 (i) -42 (ii) -419 (iii) -80 [6 marks]
e. State the functions of the following assembly language instructions:
 (i) NOP (ii) CMP (iii) JZE [3 marks]
f. What can you say of the statements
 i. mov [AAh], cbx ii. add [AAh]4, 0A10h iii. mov [si], [di] [3 marks]
g. What is a listing file? [2 marks]
- 2.** a. Distinguish between Instruction Set and Instruction Set Architecture [3 marks]
b. Distinguish between RISC and CISC architecture in a tabularized form [6marks]
c. A C-statement $x = 2 * 3$ is presented to both RISC and CISC machines. Explain vividly and with appropriate diagrams where necessary the method of executing the C-statement on each of these architectural designs. [8marks]
d. The LOAD and STORE instructions are better separated in a computing architecture. Justify.[3 marks]
- 3.** a. What are registers? What advantages have they brought to computing power since their inclusion into the Central Processing Unit? [4 marks].
b. State three examples each of the three classes of registers stating the functions of each of the mentioned examples. [9 marks]
c. Explain with a vivid example the phenomenon: *Effective addressing* [3 marks]
d. State two functions of Carry Bits [4 marks]
- 4.** a. What is a directive? Give 3 examples and state the functions of each [6 marks]
b. With the aid of diagram, explain the Assemble-Link-Debug cycle [6 marks]
c. State the functions of each of the following components
 i. ML.exe ii. Editor iii. WINDBG.exe iv. LINK32.exe [4 marks]
d. State the byte size of each of the following intrinsic data types:
 i. QWORD ii. TBYTE iii. REAL8 iv. REAL10 [4 marks]
- 5.** a. Using a concise diagram, explain the layout of an x86 processor [12 marks]
b. List and explain the specific addressing modes peculiar to the 8086 systems [8 marks]

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DEPARTMENT OF COMPUTER SCIENCE

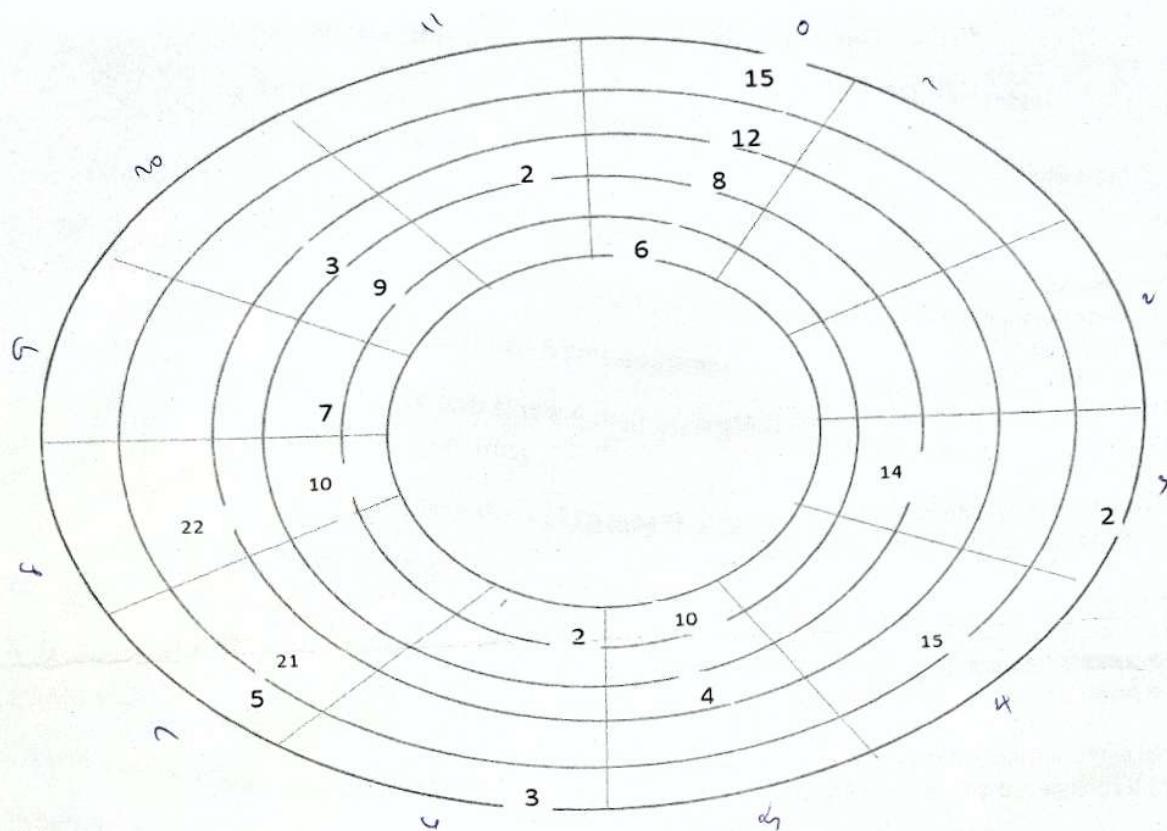
2016/2017 HARMATTAN SEMESTER EXAMINATION

CSC 224 – INTRODUCTION TO INFORMATION PROCESSING METHODS, 2 UNITS

Instruction: Answer Question 2 and any other two questions

Time Allowed: 1 hr. 30 mins

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty



1. a. i. Define file index. (2 Marks)
- ii. Explain disc allocation strategies. (4 Marks)

The above Figure depicts a non-consecutive file sectors

- b. i) Highlight two methods that can be used to keep track of the sector. (2 marks)

- ii) Explain each of the methods stated above, with their strengths and weaknesses. (4 marks)

- c) Show how each of the methods can be used to track the sectors above. (8 marks)

2. a)i) In an organization lot of information circulate, highlight five factors that determine the relevancy of such information. (5 marks)

- ii) Explain each of the factors listed above. (5 marks)

b) With the aid of diagram explain the relationship between the components of an information system. (6.5 marks)

c)i) Differentiate between manual information system and computer based information system. (6 marks)

ii) Highlight and explain five components of computer based information system. (7.5 marks)

3.a)i) Define a decision table. (3 marks)

ii) Highlight and explain the steps involved in constructing a decision table. (6 marks)

b) A student intends to monitor his/her academic status, the following are the conditions of monitoring student's status:

- The student is on good standing if his CGPA is between 1.5 & 5.0
- The student is on warning if his CGPA is < 1.5 for one semester
- The student is on withdrawal if his CGPA is < 1.5 for two semesters.

i) Using the steps involved in constructing a decision table listed above, construct a decision table for student withdrawal. (7 marks)

ii. Write test cases for each rule. (4 marks)

4. Define the following:

- a. Vertex (2 Marks)
- b. Parent (2 Marks)
- c. Child (2 Marks)
- d. Edge (2 Marks)
- e. Degree (2 Marks)
- f. Binary tree (2 Marks)
- g. Full binary tree (2 Marks)
- h. Complete binary tree (2 Marks)
- i. Draw the tree with the string notation:

(A(B(C(E),F,D), G(H,(I(J)))) (2 Marks)

What type of tree is the tree above (1 Mark)

Traverse the tree above using preorder traversals (1 Mark)

5. a.i. Explain the term sorting. (3 Marks)

ii. Explain the distinguishing features of internal and external sorting. (3 Marks)

b. Indicate if sorting is useful for the following processes or not:

- i. report generation
 - ii. Minimizing the storage needed
 - iii. making searching easier and efficient
 - iv. responding to queries easily (4 Marks)
- c. i. The way a card game player arranges his card as he picks them up one by one is an example of which sorting technique. (2 Marks)
- ii. State the steps involved in the sorting technique picked above. (6 Marks)
- iii. When is such a sorting technique most suitable. (2 Marks)

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DEPARTMENT OF COMPUTER SCIENCE
2016/2017 HARMATTAN SEMESTER EXAMINATION

CSC 220 – DATA STRUCTURE I, 3 UNITS

Instruction: Answer Question 2 and any other three questions

Time Allowed: 2 hrs

WARNING: Please note that you are not allowed to bring mobile phone(s) into the examination hall. Non-compliance will amount to examination misconduct and attract stiff penalty

1. a) Highlight the triplets of a data structure (3 marks)
b) Explain with examples the triplets of data structure. (9 marks)
c) Explain the concept of expressing a data structure with the triplets. (3 marks)
2. a) Differentiate between static and dynamic representation of linked list. Buttress your point with a diagrammatic representation of each. (4 marks)
b) i) Explain the functions of the following in a linked list:
- Memory Bank - Memory Manager - Garbage collector (6 marks)
ii) What type of linked list are the above terms applicable to, and why? (3 marks)
- c)i) Write an algorithm to merge two single linked list namely L1 and L2, where header 1 and 2 are the header nodes of each list respectively. (5 marks)
ii) Show the diagrammatic representation of L1 and L2. (4 marks)
iii) Show the diagrammatic representation of the merging process of L1 and L2. (3 marks)
N.B. Indicate the: headers, flow sequence of links, memory bank
3. a) A railway yard has just a single track. Trains enter into the railway yard for placement, and exit in opposite order to that which they entered. The number of trains packed varies.
i) Suggest the best data structure for the management of the railway yard, and explain its concept. (3 marks)
ii) Which data structure representation is the most suitable here? (1 mark)
iii) Buttress your choice with facts. (2 marks)
b) i) Write an algorithm for adding a train to the railway yard, as regards the best data structure representation for the train yard. (4 marks)
ii) Highlight 5 other applications of the suitable data structure in this case. (5 marks)
4. a.i. Explain the difference between a stack and a queue. (3 MARKS)
ii. Highlight four queue structures. (2 MARKS)
iii. Explain each of the queue structures listed above. (4 MARKS)
b.i. To avoid the restriction posed when the queue is partially full (i.e. when the rear = N and position 1... on the queue is free), what is the suitable queue structure. (1 MARK)
ii. Why is the queue structure preferred in this case? (1.5 MARKS)
c. Given a circular queue of length=4, indicate the state of the queue after processing each of the following operations. (6 MARKS)
i. Enqueue A ii. Enqueue B iii. Enqueue C iv. Enqueue D
v. Decqueue vi. Enqueue E vii. Decqueue viii. Enqueue F
ix. Decqueue x. Decqueue xi. Decqueue xii. Decqueue

5 a.i. Define a binary tree. (2.5 MARKS)

Proof that the following properties holds for a binary tree:

ii. The minimum number of nodes possible in a binary tree of height h is h . (2 MARKS)

iii. The maximum number of nodes on level l is 2^l , where $l \geq 0$. (2 MARKS)

iv. The maximum number of nodes possible in a binary tree of height h is $2^h - 1$. (2 MARKS)

c.i. Highlight the various ways in which a tree can be traversed. (1.5 MARKS)

ii. Explain each of the traversal methods listed above. (3 MARKS)

iii. Write an algorithm for any of the traversal methods listed above. (2 MARKS) N.B. Use binary tree as a case study.

6 a.i. Define sorting. (1 MARK)

ii. With the aid of diagram explain the classification of sorting techniques. (3 MARKS)

iii. Write an algorithm to sort the following set of numbers using any of the techniques listed above. 8, 22, 7, 9, 31, 19, 5, 13 (3 MARKS)

b.i. Explain your position about the importance of sorting and searching in computing. (2 MARKS)

N.B. Explain in terms of its cruciality

ii. What is the major difference between linear and binary searching techniques? (1.5 MARK)

c.i. Given a list of ten names, what is the most suitable searching technique for searching this kind of list? (1 MARK)

ii. Why is it the most suitable for this list? (1 MARK)

iii. Write the algorithm for the searching technique. (2.5 MARKS)

10/3

LAGOS STATE UNIVERSITY, OJO *
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2012/2013 SECOND SEMESTER EXAMINATION

COURSE TITLE: OBJECT ORIENTED PROGRAMMING

COURSE CODE: CSC 226

INSTRUCTIONS: Answer All Questions in Section "A" and Any three (3) Questions in Section "B".

TIME: 2 Hours

SECTION A: (25 Marks)

TRUE / FALSE QUESTIONS a = true, b = false for 1-15

- 1.) The do-while statement gets executed at least once.
- 2.) The while statement gets execute at least once.
- 3.) The for statement consists of three parts.
- 4.) If there is nothing to write in a for statement condition, an empty bracket [i.e. for ()] is allowed.
- 5.) The break statement allows us to come out of a loop.
- 6.) We cannot write a loop that can execute forever.
- 7.) The continue statement passes control back to the start of a loop.
- 8.) The continue and break statements have the same effect.
- 9.) We can nest loops.
- 10.) In while statement, the condition to be tested is at the start of the block.
- 11.) Every C++ program is also a C program.
- 12.) Every C program is also a C++ program.
- 13.) Comments in C++ have only one syntax.
- 14.) Variables in C++ must be declared before they can be used.
- 15.) The largest data type in C++ is float.

MULTIPLE CHOICE QUESTIONS.

- 16.) The looping statement that executes at least once is _____ a.) do-while b.) while c.) for
d.) repeat-until
- 17.) The _____ construct is not valid in C++ a.) do-while b.) while
c.) for d.) repeat-until
- 18.) The _____ loop allows us to step up or down one value at a time most easily is the _____ a.) do-while
b.) while c.) for d.) repeat-until
- 19.) The _____ loop will execute infinitely a.) while (0) b.) while (1) c.) while (!1)
d.) while (false)
- 20.) The _____ loop will never execute a.) while (true) b.) while (1)
d.) while (2)
- 21.) We can jump out of a loop by using the _____ statement a.) break b.) end
c.) exist d.) quit
- 22.) We can go back to the start of a loop by using the _____ statement a.) loop b.) back
c.) start d.) continue
- 23.) Although allowed, we should not use the _____ statement a.) break b.) goto
c.) continue d.) jump
- 24.) A _____ is used many times to decide if and when to break from a loop a.) flag b.) system call
c.) Condition d.) milestone
- 25.) Factorial is an example of _____ a.) sample loop b.) loop inside loop
d.) repeating statements c.) recursion

SECTION B

- 1.) Write a program to compute the roots of quadratic equation $ax^2 + bx + c = 0$ (25 Marks)
- 2.) Write a program to print the minimum of two integers. (25 Marks)
- 3.) List and describe two features of objects. (4 Marks)
- 4.) Mention and describe the three components of object oriented development. (12 Marks)
- 5.) State four objectives and two benefits of object oriented design. (9 Marks)
- 6.) Write a program to compute 10! (25 Marks)