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SAMDOS

Express

Technology.

Electronic Past Questions

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Designed by
#Sheygun
#Team Samdos

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

COMPUTER SCIENCE DEPARTMENT

COURSE CODE: CSC 205 / 311 COURSE TITLE: OPERATING SYSTEM I

SECTION: 2017/2018

TIME: 2HRS UNITS: 3

INSTRUCTION: ANSWER QUESTION 6 AND ANY THREE QUESTIONS

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

- ✓ 1.a. i. Define operating system (2 marks)
 b. i. Explain briefly how operating system evolved over years (3 marks)
 ii. List and explain the objectives of operating system (3 marks)
 iii. List four areas where operating system provides services (2 marks)
 c. i. With the aid of diagram explain the relationship between the operating system and other parts of the system (3 marks)
 ii. Operating system is a resource manager, YES/NO. Buttress your position with explanations (4.5 marks)

2. a. Explain four crucial operating system concern (12 marks)
b. Highlight the resources of operating system(2 marks)
c. Explain in detail how conflicts in operating system resources can be resolved during concurrent execution of processes (3.5 marks)

- 3.a) Explain concurrency in terms of :
i. Single processor multiprogramming (3 marks)
ii. Multiple processor multiprogramming (3 marks)

b. The procedure

Void echo()

{

Chin = getchar();

Chout = Chin;

Putchar(chout);

}

- i. How can sharing among processes lead to problem in the above procedure,

considering the fact that chin is the global resource. Using P1 and P2 as examples of processes that share the global variable, explain the sequence of instructions involved when p1 and p2 interrupts each other in the critical section. (6.5 marks)
ii. Explain how the problem stated above can be averted, use this corrective measure to correct the interruption of P1 and P2 . (5 marks)

- ✓ 4.a. Explain the concept of process in terms of :
i. Resource ownership (2 marks)
ii. Scheduling/Execution (2 marks)
b. With the aid of diagram explain how a stream of data that is on queue for execution will be executed by each the following threading approaches:
i. One process one thread (2 marks)
ii. One process Multiple threads (2 marks)
iii. Multiple processes one thread per process (2 marks)
iv. Multiple processes Multiple thread per process (2 marks)
c. i. Highlight and explain two approaches to providing parallelism by replicating processors (4 marks)
ii. Define a microkernel (1.5 marks)
✓ 5. a. Highlight and explain five basic requirements that memory management is meant to satisfy (7.5 marks)
b. i. Explain the following terms and their relationships: Physical memory and virtual memory (5 marks)
c. Differentiate between internal fragmentation and external fragmentation (5 marks)
✓ 6. Define the following terms
i. Process ii. Multithreading iii. Spawn iv. Trace v. Dispatcher
vi. Process Scheduling vii. First in first out scheduling viii. Round Robin Scheduling
Viii. Priority scheduling ix. Shortest remaining time scheduling x. throughput (17.5 marks)

LAGOS STATE UNIVERSITY, OJO

Department of Computer Science

2017/18 Harmattan Semester Examination

Course Code: CSC 313 Course Title: Algorithms and Complexity Time Allowed: 1.5 hours

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

NOTE: Mobile Phones are NOT allowed into the Examination Hall

1a. You are given an examination with questions numbered 1, 2, 3, ..., n. Each question i is worth p_i points. You must answer the questions in order, but you may choose to skip some questions. The reason you might choose to do this is that even though you can solve any individual question i and obtain the p_i points, some questions are so frustrating that after solving them you will be unable to solve any of the following f_i questions. Suppose that you are given the p_i and f_i values for all the questions as input. Devise the most efficient algorithm for choosing set of questions to answer that maximizes your total points, and compute its asymptotic worst case running time as a function of n. (7 marks)

b. Analysis of genome rearrangements in molecular biology started in the late 1930's, when Dobzhansky and Sturtevant published a milestone paper presenting a rearrangement scenario with 17 inversions for the species of Drosophila. Analysis of genomes evolving by inversions leads to a combinatorial problem of sorting by reversals studied in detail recently. Kececioglu and Sankoff conjectured that sorting by reversals is NP-hard, but despite many attempts their conjecture remains open. Discuss the implication of the findings of Kececioglu and Sankoff. (6 marks)

c. Show that for any string S of length n, the number of strings that can be obtained from S via a single reversal is at most $O(n^2)$ (4 marks)

d. List seven (7) properties of an algorithm. (7 marks)

e. What is the time complexity of the following algorithm (Note that $\sum_{i=1}^n i = \frac{n(n+1)}{2}$ and $\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$):

```

A=0;
for (i=0;i<n;i++)
    for (j=i;j<n;j++)
        for (k=0;k<n;k++)
    {
        A+=i+j+k;           ← Key operation
    } (6 marks)

```

f. Why is it important to understand and use good and efficient algorithm, you may also use relevant examples. (10 marks)

2. a. The Paper "transforming cabbage into turnip" showed that mitochondria DNA of cabbage can be transformed via three reversals of formally, a reversal of a string of length n, S_1, \dots, S_n on the internal $i \dots r$ would transform it into S_n, \dots, S_1 . As example, reversing the internal [3...5] turn string ABCDEF into ABEDCF and reversing internal [1,5] of the string COYOTE turn to TOYOCE. Show that the minimum number of reversal needed to transform A into B is the same minimum to transform B into A in its worst case. (8 marks)

b. Prove that every sorting network with n inputs has depth $\Omega(\log n)$ (7 marks)

3.a. LAS VEGAS algorithm, a classical type of randomized algorithm, always produce a correct result but run time is dependent on random choice made during algorithm. Using the understanding of the randomized algorithm, how can you tell immediately that $23898239.19392981 = 83431298313$ is false. (10 marks)

b. Experiment with example is a technique for designing good algorithm. Discuss this technique (5 marks)

4 a. Which algorithm is usually very fast, however in certain cases its run time may increase to $O(N^2)$, and that is, why it is usually not used for military and life-supporting applications. Explain why the run time may increase to $O(N^2)$ (7 marks)

b. A quadratic algorithm with processing time $T(n) = cn^2$ spends $T(N)$ seconds for processing N data items. How much time will be spent for processing $n = 5000$ data items, assuming that $N = 100$ and $T(N) = 1\text{ms}$? (8 marks)

5a. Are the following TRUE or FALSE or UNKNOWN TO SCIENCE

- i. The complement of a language in DSPACE($\log(n)$) is also in DSPACE($\log(n)$). (2 marks)
- ii. There is no NP-complete problem whose compliment is also NP-Complete. (2 marks)

- iii. Any NP-Complete problem is also P-Complete (2 marks)

b. i. State the steps required for developing a Dynamic Programming Algorithm for a Knapsack problem. (4 marks)
ii. What is Reducibility (2 marks)

c. List three (3) examples of the Greedy Method approach to designing (3 marks) *an efficient algorithm*

LAGOS STATE UNIVERSITY, OJO, LAGOS
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
2017/2018 HARMATTAN SEMESTER EXAMINATION

CSC 331 – DATABASE MANAGEMENT SYSTEM, 2 UNITS 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

Instruction: Answer Question 1(Compulsory) and any other three (3)

Question 1 (25marks)

Suppose there is an insurance company, the business primarily revolves around insurance policies – effectively a financial product assuring risk between the holder of the policy and some event such as death, building damage or car accident. The basic part of the database is likely to be organized in the following fashions:

Policies (policyNo, holderNo, startDate, premium, renewalDate, policyType)

PolicyHolder (holderNo, holderName, holderAddress, holderTelno)

Using SQL statement:

- i. Produce the CREATE TABLE for the database 4mks
- ii. What data types are appropriate for each column in these tables and why? 2mks
- iii. Where is NOT NULL relevant? 2mks
- iv. Declare the primary keys for this schema 2mks
- v. Declare the foreign key for this schema. 2mks
- vi. The company want to enforce the business rule such that a policy's startDate should be less than a policy's renewalDate. 3mks
- vii. Add new holder information ('4324', 'O. Christy', 'Computer science Department' '08031526789') into the PolicyHolder's table of this database. 2mks
- viii. Remove a particular policy holder with holderNo 4324. 2mks
- ix. A query to retrieve all standard 'life' policies 3mks
- x. A query to list holder numbers and names of all persons holding standard life policies. 3mks

Question 2 (15marks)

- a. Describe the ways in which data modelling contribute to the Information System planning process and illustrate with a description of its relevance to a university domain (5mks)
- b. Distinguish between operational databases and a decision support databases (5mks)
- c. Identify the three common types of users of database systems and explain their roles. (5mks)

Question 3 (15marks)

Modules

| ModuleName | level | courseCode | staffNo |
|----------------------------|-------|------------|---------|
| Relational Database System | 1 | CSC101 | 244 |
| Relational database design | 1 | CSC102 | 244 |
| Deductive databases | 3 | CSC301 | 445 |
| Object oriented databases | 3 | CSC302 | 445 |
| Distributed Databases | 2 | CSC201 | 247 |
| Database Development | 2 | CSC203 | null |
| Data Administration | 2 | CSC205 | null |

Lecturers

| StaffNo | StaffName | Status |
|---------|-----------|--------|
| 244 | John A.O | L |
| 247 | Kayode O. | SL |

| | | |
|-----|----------|----|
| 124 | Peter O. | L |
| 145 | Thomas P | SL |
| 445 | Evans R | P |

Perform the following operations on Modules and Lecturers tables:

- i. Left outer join (5mks)
- ii. Right outer join (5mks)
- iii. Two-way outer join (5mks)

Question 4 (15marks)

- i. Explain the layers of an ICT system (5mks)
- ii. Explain client-server architecture (5mks)
- iii. Explain the three schema architectures (5mks)

Question 5 (15marks)

- a. i. What is normalization? (1mk) ii. When is a table in 1NF? (1mk)
- iii. When is a table in 2NF? (1mark) iv. When is a table in 3NF? (1mark)
- iv. When is a table in BCNF? (1mk)
- b. What is a partial dependency? With what normal form is it associated? (4mks)
- c. i. What three data anomalies are likely to be the result of data redundancy? (3mks)
- ii. How can such anomalies be eliminated? (3mks)

Question 6 (15marks)

- a. Why would you choose a database system instead of simply storing data in operating system files? When would it make sense not to use a database system? 5mks
- b. Explain the difference between logical and physical data independence. 5mks
- c. Describe the basic features of the relational data model and discuss their importance to the end user and the designer? 5mks

LAGOS STATE UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
2017/2018 HARMATTAN SEMESTER EXAMINATIONS

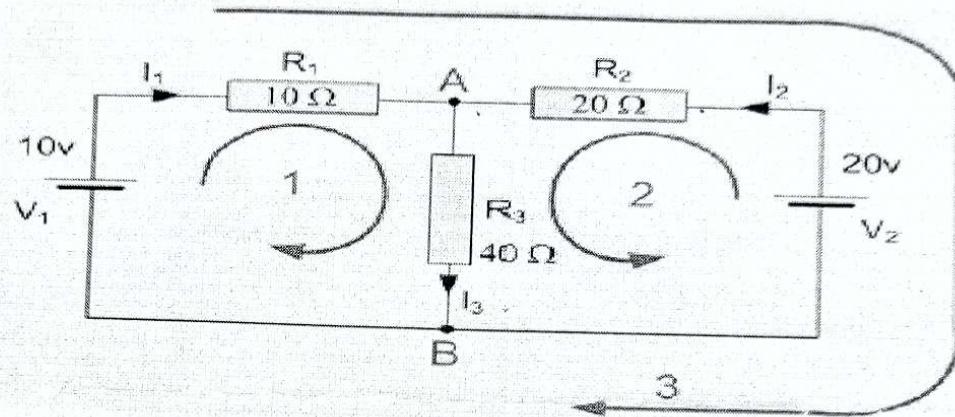
Course Title: FUNDAMENTALS OF DIGITAL ELECTRONICS

Course Code: CSC 217/317

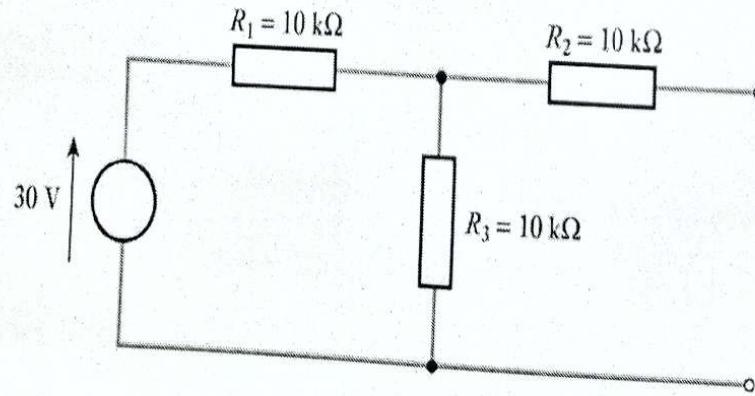
Time Allowed: 1 Hr 30mins

Instruction: Answer Question 1 and any other TWO questions.

- A. a. State with appropriate diagram the Kirchhoff's
 i. closed loop rule ii. junction rule **(6 marks)**
 b. Distinguish between active and passive elements including three (3) examples each. **(4 marks)**
 c. In the network below, determine the values of the current (I_1 , I_2 , I_3) flowing through each of the resistors using the Kirchhoff's rules.



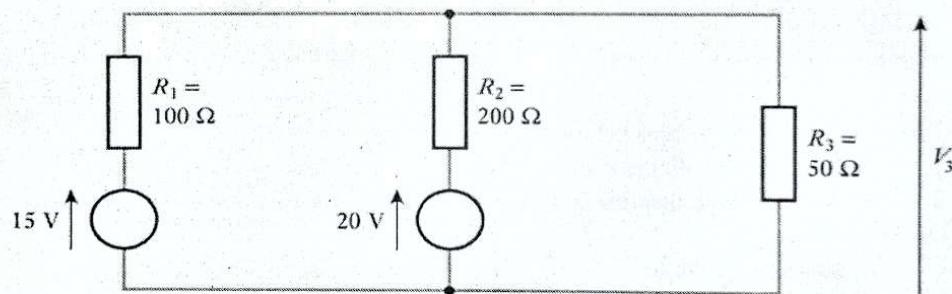
- d. Verify with the aid of a truth table the following algebraic expressions **(10 marks)**
 i. $AB'(B+C) = AB'C$ ii. $A'B'C = (A+B+C')$ **(4 marks)**
 e. Describe with logic circuit, truth table and algebraic representation of a D-Latch **(6 marks)**
2. a. State with adequate diagrams the following:
 i. Thevenin's network theorem
 ii. Norton's network theorem **(6 marks)**
 b. Define the following:
 (i) Thevenin's voltage (ii) Norton's current
 (iii) Thevenin's resistance (iv) Norton's resistance **(4 marks)**
 c. Determine and sketch the equivalent Thevenin's and Norton's network of the following circuit.



3. The truth table below represents a circuit of four variable inputs A,B,C and D and one output Q:

| A | B | C | D | Q |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 |

- a. Derive the Karnaugh Map of the circuit. (4 marks)
 - b. Obtain from the Karnaugh Map the corresponding algebraic expression (3 marks)
 - c. Use Karnaugh Map reduction to reduce the algebraic expression to get the best sum of products (SOP). (5 marks)
 - d. Reduce your answer in (c) above using appropriate Boolean axioms (4 marks)
 - e. Draw the logic gate of the result of (d) above. (4 marks)
4. a. State the superposition theorem (4 marks)
- b. How is the effect of a single independent source determined in a network? (4 marks)
- c. V_3 in the circuit below is found by the superposition theorem to be 7.15V. Using the same theorem, find V_3 if the value of each resistor is halved and the value of each voltage source is doubled. In a statement, state your observation on this change. (12 marks)



5. a. What is an integrated circuit? (2 marks)
- b. Highlight four (4) advantages and four (4) disadvantages of an integrated circuit over a discrete network (4 marks)
- c. Corroborate that thin-film IC and thick-film IC are not distinguished by their relative thickness (6 marks)
- d. Explain the four process stages in the manufacturing of an IC. (8 marks)

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2017/2018 HARMATTAN SEMESTER EXAMINATION

CSC 339 – SYSTEM ANALYSIS AND DESIGN

3 Units

Instruction: Answer TWO Questions in Section A and TWO Questions in Section B

Time Allowed: 2hrs

Section A (Instruction: Answer only TWO questions in this Section)

Question 1 (17.5 Marks)

- a. Explain system analysis and design and state four principal roles of a system analyst. (4 Marks)
- b. D&G Audit Nigeria Limited is an audit firm that does external auditing of both public and private organizations' accounts and business processes. The management of D&G wants to carry out a total overhauling of her business processes and protocols with the view to develop an e-Business platform that makes their business processes to be fully automated. D&G contracted the project of the e-Business System development to you because of your expertise in system analysis and development. Your job is to do a comprehensive study of the entire business processes of D&G, develop and deploy the e-Business software required.
 - i. Explain three facts gathering methods that you could use to get all required information about the company business activities. (3 Marks)
 - ii. You are required to write a detail report to the management of D&G discussing the critical activities that you will need to carry out in all the phases of the System Development Life Cycle (SDLC) vis-à-vis the deliverables in reference to this project. (10.5 Marks)

Question 2 (17.5 Marks)

- a. What is a process model and list five different types of process modelling techniques. (3 Marks)
- b. State the basic elements of Data flow diagram (DFD) (2.5 Marks)
- c. Consider the case of an online university registration system for AFAD University described thus: The system should enable the staff of each academic department to manage the courses offered by their department, add and remove courses, and change the information about them (e.g., the maximum number of students permitted). It should permit students to access currently available courses, add and drop courses to and from their schedules, and access the courses for which they are enrolled. Department staff should be able to print a variety of reports about the courses that the students enrolled in them. The system should ensure that no student takes too many courses and that students who have any unpaid fees are not permitted to register. (Assume that a fees data store is maintained by the university's financial office, which the registration system accesses but does not change.)
 - i. Draw the context diagram of the system (4 Marks)
 - ii. Draw the Level 0 DFD of the system (4 Marks)
 - iii. Draw the Level 1 DFD of the system (4 Marks)

Question 3

- a. What is a Gantt chart and how is it relevant in software development project management? (5.5 Marks)
- b. Table 1 presents the activity list of FAD IMS project on development of an inventory management software for FAD Venture Nigeria Ltd. FAD Ventures deals in production and distribution iron rods. The company need an inventory management software (IMS) to manage her stock for proper accountability. Use the details presented in the activity table to draw the Gantt Chat for the project. (9 Marks)
- c. Describe three technical skills and three interpersonal skills that you would need to have for you to be on any software development project. (3 Marks)

Table 1 FAD IMS Project Activity Table

| ID | Task Name | Duration | Start Date | Finish Date | Predecessors | Resource Person Name |
|----|----------------------------------|----------|------------|-------------|--------------|-------------------------|
| 1 | Overall Analysis | 10 Days | 4/2/2017 | 15/2/2017 | None | |
| 2 | Identify High-Level Requirements | 6 Days | 4/2/2017 | 11/2/2017 | None | |
| 3 | JAD session | 4 Days | 4/2/2017 | 7/2/2017 | None | Ebun, Sola, Mabel |
| 4 | Informal benchmarking | 2 Days | 8/2/2017 | 11/2/2017 | 3. | Bade, Kemi |
| 5 | Prioritize requirements | 2 Days | 12/2/2017 | 13/2/2017 | 2 | Femi |
| 6 | Define Version 1 scope | 2 Days | 14/2/2017 | 15/2/2017 | 5 | Femi, Sola |
| 7 | Version 1 | 61 Days | 18/2/2017 | 13/5/2017 | | |
| 8 | Detailed Requirements | 17 Days | 18/2/2017 | 12/3/2017 | | |
| 9 | Develop Use cases | 5 Days | 18/2/2017 | 22/2/2017 | 6 | Bimpe |
| 10 | Develop process models | 12 Days | 25/2/2017 | 12/3/2017 | 9 | Bimpe |
| 11 | Develop data model | 3 Days | 25/2/2017 | 27/2/2017 | 9 | Bade |
| 12 | Preliminary design | 27 Days | 18/2/2017 | 27/3/2017 | | |
| 13 | System Architecture | 5 days | 18/2/2017 | 22/2/2017 | 6 | Sola |
| 14 | User interface design | 7 Days | 17/3/2017 | 21/3/2017 | 10 | Bimpe |
| 15 | Database design | 10 Days | 28/2/2017 | 13/3/2017 | 11 | Bade |
| 16 | Program design | 10 Days | 13/3/2017 | 26/3/2017 | 13, 10 | Sola |
| 17 | Implementation | 56 Days | 25/2/2017 | 13/5/2017 | | |
| 18 | Acquire Hardware & Software | 10 days | 25/2/2017 | 8/3/2017 | 13 | Sola |
| 19 | Construct database | 7 Days | 14/3/2017 | 22/3/2017 | 15 | Bade |
| 20 | Convert data | 5 Days | 25/3/2017 | 29/3/2017 | 19 | Bade |
| 21 | Coding | 20 Days | 27/3/2017 | 23/4/2017 | 16, 10 | Bimpe, Sola |
| 22 | Testing | 10 days | 24/4/2017 | 7/5/2017 | 20, 21 | Bade, Sola, Bimpe |
| 23 | Installations | 4 Days | 8/5/2017 | 13/5/2017 | 22 | Bade, Sola, Bimpe |
| 24 | Version 2 | 42 Days | 14/5/2017 | 12/7/2017 | 23 | Kemi, Bade, Sola, Bimpe |
| 25 | Version 3 | 28 Days | 11/7/2017 | 19/8/2017 | 24 | Kemi, Bimpe, Sola, Bade |

Section B (Instruction: Answer only TWO questions in this section)**Question 4 (17.5 Marks)**

- a. What is the main difference between strategic and tactical information? If an information system is to be designed for a hospital, what would be the strategic, tactical information? (7.5 Marks)
- b. Briefly describe three types of reports that can be generated by management information system. (6 marks)
- c. Distinguish between direct and parallel system conversion approaches (4 Marks)

Question 5 (17.5 Marks)

- a. What is the basic difference between business data processing systems and management information system? (2.5 Marks)
- b. What special skills should a system analyst possess? (5 Marks)
- c. Why can't managers design their own systems? (5 Marks)
- d. Are excellent programmers necessarily excellent system analysts? Justify your answer (5 Marks)

Question 6

- a. What is meant by cost benefit analysis? (2.5 Marks)
- b. Is it essential to have tangible benefits to justify an information system? If your answer is no, justify your answer by giving an example. (5 Marks)
- c. Distinguish between technical, operational, and economic feasibility (10 Marks)

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Lagos State University
Faculty of science
Department of computer science

Course code: CSC 337

Course Title: Data Structures II

Semester: Harmattan

Session: 2009/10

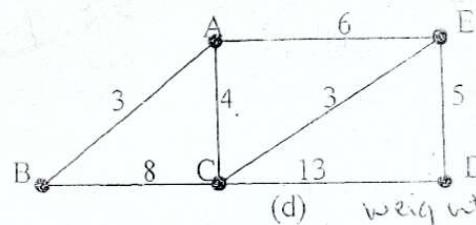
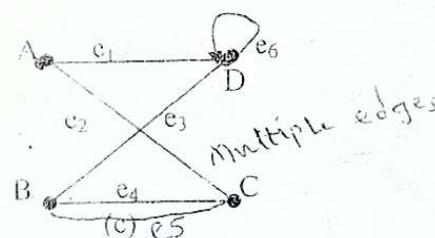
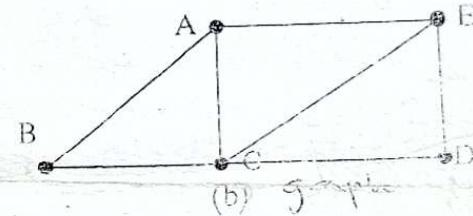
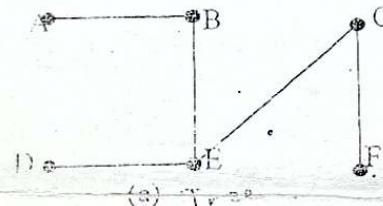
Time Allowed: 2 Hours

Instruction: Answer any four (4) questions

b. Given this arithmetic expression $Q: 13, 2, +, 8, 4, /, 7, *, -$. Write its prefix notation.

+ 13, 2, /, * 8, 4, 7

b. Identify, name and explain each of the diagram given below:



2a. Write short note on each of the following:

i. Data Structures ii. Linked Lists

b. A binary tree T has 9 nodes. The inorder and preorder traversals of T yield the following sequences of nodes:
Inorder: E A C K | F | H D B G
Preorder: F A E K C | D H G B

Draw the tree T.

c. What is Polish notation?

Consider the algebraic expression $E = (2x + y)(5a - b)^3$

d. Draw the tree T which corresponds to the expression E.

A E C

e. Find the subtree rooted at the exponential operator.

f. Find the prefix polish expression P which is equivalent to E and find the preorder of P.

Given these infix notations: (i) $A + (B * C)$, (ii) $(A + B)^*C$, (iii) $(A + B)/(C - D)$

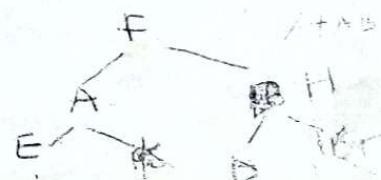
Find the corresponding polish notations.

$+ A (* B C)$
 $+ A * B C$

$+ A B ^ * C$

$+ A B / - C D$

F E A C



LAGOS STATE UNIVERSITY
FACULTY OF SCIENCE
COMPUTER SCIENCE DEPARTMENT

SESSION: 2011/2012

COURSE TITLE: ALGORITHM AND COMPLEXITY

SEMESTER: HARMATTAN

INSTRUCTION: ANSWER QUESTIONS 1 AND ANY OTHER THREE

COURSE CODE: CSC 313

TIME: 2 HRS

- a. i. Explain the term algorithm analysis
- ii. Define asymptotic notation
- iii. List and explain all the asymptotic notations

- b. Arrange the following functions according to their order of growth

1. $(n-2)!$ — \checkmark

2. $5\log(n+100)^{10}$ — \log

3. 2^{2^n} — \exp

4. $0.001n^3 + 3n^3 + 1$ — Pow

5. \ln^n — \log

6. $\beta(n)^{1/2}$ — Pow

7. 3^n — \exp

8. n^{α} — \log

9. n^{α} — \exp

10. n^{α} — \log

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LAGOS STATE UNIVERSITY, OJO
DEPARTMENT OF COMPUTER SCIENCE
2015/2016 RAIN SEMESTER EXAMINATION
COURSE TITLE: SOCIAL AND PROFESSIONAL ISSUES IN INFORMATION TECHNOLOGY
COURSE CODE: CSC 340

INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER TWO (2) QUESTIONS

TIME: 1 HOUR 30 MINUTES

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

- Q1(a) List and explain three general causes of unethical and illegal behaviour [6 marks] *Answers*
(b) List five (5) challenges to intellectual property rights [5 marks] *Answers*
(c) State five (5) steps to be followed in carrying out ethical analysis [5 marks] *Answers*
(d) state four(4) features of each of the following ethical approaches (i) virtue ethics (ii) utilitarianism (iii) fairness (iv) common good [8 marks] *Answers*
(e) state each of the following candidate ethical principles (i) Golden rule (ii) Decantes rule of change (iii) utilitarian (iv) Risk Aversion (v) No free lunch [6 marks] *Answers*

- Q2 (a) A student of LASU has recently developed a new software and there is a current debate in the department of computer science as to whether the software should be copyrighted or patented. Advise the department of computer science on your view from Utilitarian perspective [10 marks] *Answers*

- (b) Why does a copyright provide better protection for object code than for source code? [10 marks] *Answers*
- Q3(a) Akinwumi works for the county health department as a computer records clerk, where he has access to files of patient records. For a scientific study, a researcher, Ayo has been granted access to the medical portion but not the corresponding names of some records. Ayo finds some information that she would like to use, but she needs the names and contact details (e.g. postal addresses) corresponding with certain medical histories. Ayo asks Akinwumi to retrieve the names and addresses in order to contact these people for more information and for permission to do further study. Describe how each of the following will analyse the case above (i) Egoist (ii) Rule Deontologist. [14 marks] *Answers*

- (b) Identify two ways in which you can be guided in making ethical choices [6 marks] *Answers*

- Q4(a). Ayo works as a programmer in a corporation. Olu, her supervisor told her to write a program to allow people to post entries directly to the company's accounting files ("the books"). Ayo knows that ordinarily programs that affect the books involve several steps, all of which have to balance. Ayo realizes that with the new program it will be possible for one person to make changes to crucial amounts and there will be no way to trace who made these changes, the reason or when. Ayo raised these concerns to Olu, who told her not to be concerned that her job is simply to write the programs as instructed. Olu said he is aware of the potential mixture of their programs, but he justified his directive by noting that periodically a figure is mistakenly entered in the books, and they need a way to correct the inaccurate figure. Analyse this scenario from Act-Deontologist and Utilitarian perspectives. [15 marks] *Answers*

- (b) What is the difference between Hacktivist and Cyberterrorist? [5 marks] *Answers*

- Q5.(a) List the different phases of recovering evidence from a computer. Explain each in details. [10 marks]
(b) Computer forensics can be used to investigate a wide variety of computer crimes. Discuss. [10 marks] *Answers*

LAGOS STATE UNIVERSITY, OJO

DEPARTMENT OF COMPUTER SCIENCE

2014/2015 RAIN SEMESTER EXAMINATION

COURSE TITLE: SOCIAL AND PROFESSIONAL ISSUES IN INFORMATION TECHNOLOGY
COURSE CODE: CSC 340

INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER THREE (3) QUESTIONS
TIME: 2 HOURS

- Q1 (a) Why is it important to foster good business ethics? 5 marks
(b) Identify three consequences of bad ethics 3 marks
(c) Identify three sources of poor system performance? 3 marks
(d) State each of the following rules (a) Golden rule (b) Descartes rule of change (c) No free lunch rule 9 marks
(e) How does a bribe differ from a gift? 5 marks

Q2 (a) ABC company is a multinational company that is customer-based in her business but currently trying to expand the business by acquiring new computers for its daily activities and there are chances that people could abuse the computers. As a computer expert, advice ABC on computer abuse by identifying and briefly describing six types of computer abuse. 9 marks
(b) Explain how computer abuse can be prevented 6 marks

Q3 (a) Why does a copyright provide better protection for object code than for source code? 5 marks
(b) Identify five categories of computer crime perpetrators and state their motives. 10 marks

Q4 (a) A student of LASU has recently developed a new software and there is a current debate in the department of computer science as to whether the software should be copyrighted or patented. Advise the department of computer science on your view from Utilitarian perspective. 10 marks
(b) State five ways in which law is different from ethics 5 marks

Q5. Donald works for the county health department as a computer records clerk, where he has access to files of patient records. For a scientific study, a researcher, Ethel has been granted access to the medical portion but not the corresponding names of some records. Ethel finds some information that she would like to use, but she needs the names and addresses corresponding with certain medical histories. Ethel asks Donald to retrieve the names and addresses in order to contact these people for more information and for permission to do further study. Identify and discuss the ethical principles involved in this case. 15 marks

Q6. Briefly describe each of the following ethical theories (a) Deontology (b) Act Utilitarianism (c) Rule Utilitarianism 15 marks

LAGOS STATE UNIVERSITY, ÓJO, LAGOS
FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2014/2015 RAIN SEMESTER EXAMINATION

COURSE TITLE : FUNCTIONAL PROGRAMMING LANGUAGE (CSC 322) **COURSE UNIT: 3**
INSTRUCTION : ATTEMPT QUESTION ONE and ANY OTHER THREE
TIME ALLOWED : TWO HOURS

- | | |
|--|-----------|
| 1a. What is LISP and give an example of some of the popular applications built in LISP? | [3 marks] |
| b. Define a <i>Function</i> in LISP | [2 marks] |
| c. Differentiate between the Functional Programming and Imperative Programming language | [4 marks] |
| d. Why is LISP used for Artificial Intelligence? | [2 marks] |
| e. Demonstrate with an example how a programmer can code using LISP? | [3 marks] |
| f. Explain the programming structure used in LISP | [3 marks] |
| g. Describe how data types are categorized in LISP | [3 marks] |
| h. List the types of variables available in LISP | [2 marks] |
| i. What are the variables that are bound, and that have values assigned to them in LISP? | [2 marks] |
| j. What are LISP constants? | [2 marks] |
| k. Is it possible to call LISP functions from other languages? | [2 marks] |
| l. Mention the three functions required by LISP? | [3 marks] |
| m. Explain <i>predicate</i> in LISP | [3 marks] |
| n. Explain the importance of the <i>hash table</i> in LISP | [2 marks] |
| o. What is <i>setq</i> used for in LISP? | [3 marks] |
| p. What is <i>cdr</i> used for in LISP? | [2 marks] |
| 2ai. What is functional programming? | [2 marks] |
| ii. What are the prime attributes of functional programs? | [2 marks] |
| b. Define a functional program, with no explicit recursion, that produces the following output for a given integer max . Do not use lambda-functions. | |
| (fun-list 0) → NIL | |
| (fun-list 1) → (1) | |
| (fun-list 2) → ((1 2) 2) | |
| (fun-list 3) → (((1 2) 3) (2 3) 3) | |
| (fun-list 5) → ((((1 2) 3) 4) 5) (((2 3) 4) 5) ((3 4) 5) (4 5) 5) | |

Hints: Consider the top level sub-lists of the output; note that they are nothing but the reduction (**reduce**) of some range using **list**.

(defun fun-list (max) ; You supply the rest

[6 marks]

- | | |
|---|-----------|
| 3ai. What are macros? | [2 marks] |
| ii. State two advantages of using macros? | [2 marks] |
| b. Write a macro definition | |

(select all elements from **aList** but the **aPosition**)

that produces a program, which when evaluated, returns **aList** after removing the element in position **aPosition**.

Here, **aPosition** is one of the following.

aPosition: first, second, third

For all other values of **aPosition** return **nil**.

Example

(select all elements from '(1 2 3) but the first) → (2 3)
(select all elements from '(1 2 3) but the third) → (1 2)

Complete the macro definition, without using backquote.

(defmacro select ;; complete the parameters and body

[6 marks]

- | | |
|---|-------------|
| 4a. Write <i>functions</i> for: | |
| i) addition, subtraction and multiplication of 2 numbers; and | [6 marks] |
| ii) print their individual results. | [1.5 marks] |
| b. Write a <i>function</i> that can add two lists to one | |
| | Appendix |
| 5a. Write a LISP program to | |
| i. find the last element of a non-null list. | [6 marks] |
| ii. remove the first occurrence of atom A in list, L | [4 marks] |
| b. Write LISP <i>functions</i> to add two polynomials | |
| 6ay: What is garbage collection? | [2 marks] |
| ii. How does it work? | [2 marks] |
| b. Explain the concept of Heap management | [6 marks] |

LAGOS STATE UNIVERSITY, OJO, LAGOS
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DEPARTMENT OF COMPUTER SCIENCE
2015/2016 RAIN SEMESTER EXAMINATION
CSC 328 – COMPUTER ARCHITECTURE, 3 UNITS
INSTRUCTION: Answer any four questions

Question 1

- a. What is cache? [3.5marks]
- b. Explain the two basic approaches of writing data to cache [5marks]
- c. What is Instruction set architecture? [4marks]
- d. Differentiate between RISC and CISC architectures [5marks]

Question 2

- a. State five functions of control unit [5marks]
- b. Name and explain the two techniques used in designing the control units [6marks]
- c. What are the advantages and problems associated with the hardwired control units? [3marks]
- d. In computer design, the instruction execution has three major phases. Name and explain them [3.5marks]

Question 3

- a. Convert 27.315 to binary [2.5marks]
- b. Demonstrate by means of truth tables the validity of the following identities:
 - i. DeMorgan's theorem for three variables: $(x+y+z)' = x'y'z'$ [5marks] and $(xyz)' = x' + y' + z'$ [5marks]
 - ii. The distributive law: $x+yz = (x+y)(x+z)$ [5marks]

Question 4

Write short notes on the following terminologies

- a. Microprogram [3.5marks]
- b. Microinstruction [3.5marks]
- c. Microoperations [3.5marks]
- d. Microinstruction format [3.5marks]
- e. Micro sequencer [3.5marks]

Question 5

- a. Obtain the truth table of the following functions, and express each function as a sum-of-minterms and a product-of-maxterms:
 - i. $(x + yz)(z + xz)$ [3.5marks]
 - ii. $(xy' + yz + x'y)(x + y)$ [4marks]
- b. Draw the logic diagram for the following Boolean expressions. The diagram should correspond exactly to the equation. Assume that the complements of the inputs are not available.
 - i. $WX'Y + W'Z + YZ$ [5marks]
 - ii. $A(BD') + (B'D) + D(BC + (B'C'))$ [5marks]

Question 6

- a. Simplify the following Boolean functions by means of a three-variable map
 - i. $F(X,Y,Z) = m(1,3,6,7)$ [3.5marks]
 - ii. $F(A, B, C) = m(0,1,2,4,6)$ [3.5marks]
 - iii. $F(A,B,C) = m(0,3,4,5,7)$ [3.5marks]
- b. Simplify the following boolean function using a map
 - i. $A'BC'D + A'B'CD + ABC'D' + ABC'D + ABCD + ABCD' + AB'CD + AB'CD' + AB + BC + CD + AD + BD$ [3.5marks]
 - ii. $A'B'C' + A'B'C + A'BC' + ABC' + ABC$ [3.5marks]

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DEPARTMENT OF COMPUTER SCIENCE
2014/2015 RAIN SEMESTER EXAMINATION

CSC 328 - COMPUTER ARCHITECTURE

TIME ALLOWED: 2 HOURS

Instruction - Answer Four (4) Questions

Q1a. Describe the concept of Von Neumann architecture

(8½ Marks)

b. Explain the seven (7) levels of machines in the computer

(9 Marks)

Q2. Copy and complete the table below.

(10 Marks)

| Decimal | Binary | Octal | Hexadecimal |
|---------|--------|-------|-------------|
| 16 | 1000 | | |
| 10 | | | |
| | | 15 | |
| 18 | | | 10 |
| | | 27 | |
| 25 | 11010 | | 1A |

2b. Why do we use hexadecimal number in a modern computer? (3 Marks)

c. If an 8-bit binary number is used to represent an analog value in the range from 010 to 10010. what does the binary value 01100100₂ represent? (4½ Marks)

Q3a. Assume a digital to analog conversion system uses a 10-bit integer to represent an analog temperature over a range of -25°F to 125°F. If the actual temperature being read was 65.375°F, what would be the closest possible value that the system could represent? (6 Marks)

b. Why a CPU increments program counter (PC) during the Fetch Cycle? (6 Marks)

c. Find the sum of (-35) and (-58) in binary number and convert your answer back to decimal number (5½ Marks)

Q4. With the aid of a suitable diagram, explain the term memory hierarchy considering the cost, speed, and size. (17½ Marks)

Q5. Explain stages of central processor unit (CPU) from pre-Von Neumann computer systems to Von Neumann architecture. Support your explanations with suitable diagrams. (17½ Marks)

Q6. Explain sequence of actions the CPU performs before fetching instructions from memory (6 Marks)

b. Discuss steps involved in order for CPU to perform the ADD instruction. (6 Marks)

c. Draw a diagram for fetch and decode ADD instruction cycles for a simple CPU. (5½ Marks)



Instruction: Answer question one and any other three

Question 1 (25 marks)

- a. Imagine that after getting your BSc. degree, you applied for a job as a director of a large computer center that just put its ancient operating system out of pasture and switched over to UNIX. You got the job. Fifteen minutes after starting work, your assistant ran into your office screaming: "some students discovered the algorithm we use for encrypting passwords and posted it on the internet." What should you do and why?
- b. Name three pitfalls to watch out for when backing up a file system
- c. What is the difference between a virus and a worm? How do they each reproduce?
- d. A standard PC can hold only four operating systems at once, is there any way to increase this limit? What consequences would your proposal have?
- e. Give 5 different path names for the file /etc/password
- f. Some files begin with a magic number. Of what use is this?

Question 2 (15 marks)

- a. When a file is removed, its blocks are generally put back on the free list, but they are not erased. Do you think it would be a good idea to have the operating system erase each block before releasing it? Consider both security and performance factors in your answer and explain effect of each
- b. Consider a system that supports the strategies of contiguous, linked, and indexed allocation. What criteria should be used in deciding which strategy is best utilized for a particular file?
- c. How do caches help improve performance? Why do systems not use more or larger caches if they are so useful?
- d. How can we overcome fragmentation?
- e. Rank the allocation methods on speed

Question 3 (15 marks)

- a. List three examples of deadlocks that are not related to a computer-system environment
- b. Some systems automatically open a file when it is referenced for the first time, and close the file when the job terminates. Discuss the advantages and disadvantages of this scheme as compared to the more traditional one, where the user has to open and close the file explicitly
- c. Give an example of an application that could benefit from operating system support for random access to indexed files.
- d. If the operating system were to know that a certain application is going to access the file data in a sequential manner, how could it exploit this information to improve performance?

Question 4 (15 marks)

- a. Some systems provide file sharing by maintaining a single copy of a file; other systems maintain several copies, one for each of the users sharing the file. Discuss the relative merits of each approach.
- b. In what situations would using memory as a RAM disk be more useful than using it as a disk cache?
- c. Some file systems allow disk storage to be allocated at different levels of granularity. For instance, a file system could allocate 4 KB of disk space as a single 4-KB block or as eight 512-byte blocks. How could we take advantage of this flexibility to improve performance? What modifications would have to be made to the free-space management scheme in order to support this feature?
- d. What are the advantages of the variation of linked allocation that uses a FAT to chain together the blocks of a file?

Question 5 (15 marks)

- a. Consider a file system that uses a modified contiguous-allocation scheme with support for extents. A file is a collection of extents, with each extent corresponding to a contiguous set of blocks. A key issue in such systems is the degree of variability in the size of the extents. What are the advantages and disadvantages of the following schemes?
 - i. All extents are of the same size, and the size is predetermined.
 - ii. Extents can be of any size and are allocated dynamically.
 - iii. Extents can be of a few fixed sizes, and these sizes are predetermined.
- b. What are the various kinds of performance overheads associated with servicing an interrupt?
- c. What are the advantages and disadvantages of supporting memory-mapped I/O to device control registers?
- d. State and explain three different protection mechanisms

Question 6 (15 marks)

- a. A password may become known to other users in a variety of ways. Is there a simple method for detecting that such an event has occurred? Explain your answer.
- b. The list of all passwords is kept within the operating system. Thus, if a user manages to read this list, password protection is no longer provided. Suggest a scheme that will avoid this problem. (Hint: Use different internal and external representations.)
- c. An experimental addition to UNIX allows a user to connect a watch-dog program to a file. The watchdog is invoked whenever a program requests access to the file. The watchdog then either grants or denies access to the file. Discuss two pros and two cons of using watchdogs for security.
- d. Make a list of six security concerns for a bank's computer system. For each item on your list, state whether this concern relates to physical, human, or operating-system security.



Instruction: Answer question one and any other three

Question 1 (25 marks)

- Imagine that after getting your BSc. degree, you applied for a job as a director of a large computer center that just put its ancient operating system out of pasture and switched over to UNIX. You got the job. Fifteen minutes after starting work, your assistant ran into your office screaming: "some students discovered the algorithm we use for encrypting passwords and posted it on the internet." What should you do and why?
- Name three pitfalls to watch out for when backing up a file system
- What is the difference between a virus and a worm? How do they each reproduce?
- A standard PC can hold only four operating systems at once, is there any way to increase this limit? What consequences would your proposal have?
- Give 5 different path names for the file /etc/password
- Some files begin with a magic number. Of what use is this?

Question 2 (15 marks)

- When a file is removed, its blocks are generally put back on the free list, but they are not erased. Do you think it would be a good idea to have the operating system erase each block before releasing it? Consider both security and performance factors in your answer and explain effect of each
- Consider a system that supports the strategies of contiguous, linked, and indexed allocation. What criteria should be used in deciding which strategy is best utilized for a particular file?
- How do caches help improve performance? Why do systems not use more or larger caches if they are so useful?
- How can we overcome fragmentation?
- Rank the allocation methods on speed

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- Some systems automatically open a file when it is referenced for the first time, and close the file when the job terminates. Discuss the advantages and disadvantages of this scheme as compared to the more traditional one, where the user has to open and close the file explicitly
- Give an example of an application that could benefit from operating system support for random access to indexed files.
- If the operating system were to know that a certain application is going to access the file data in a sequential manner, how could it exploit this information to improve performance?

Question 4 (15 marks)

- Some systems provide file sharing by maintaining a single copy of a file; other systems maintain several copies, one for each of the users sharing the file. Discuss the relative merits of each approach.
- In what situations would using memory as a RAM disk be more useful than using it as a disk cache?
- Some file systems allow disk storage to be allocated at different levels of granularity. For instance, a file system could allocate 4 KB of disk space as a single 4-KB block or as eight 512-byte blocks. How could we take advantage of this flexibility to improve performance? What modifications would have to be made to the free-space management scheme in order to support this feature?
- What are the advantages of the variation of linked allocation that uses a FAT to chain together the blocks of a file?

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- State and explain three different protection mechanisms

Question 6 (15 marks)

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- The list of all passwords is kept within the operating system. Thus, if a user manages to read this list, password protection is no longer provided. Suggest a scheme that will avoid this problem. (Hint: Use different internal and external representations.)
- An experimental addition to UNIX allows a user to connect a watch-dog program to a file. The watchdog is invoked whenever a program requests access to the file. The watchdog then either grants or denies access to the file. Discuss two pros and two cons of using watchdogs for security.
- Make a list of six security concerns for a bank's computer system. For each item on your list, state whether this concern relates to physical, human, or operating-system security.

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

CSC 326 – OPERATING SYSTEM II

Instruction: Answer all questions in Section A and Two questions 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.

Time Allowed: 1 hour 30 minutes

SECTION A

1. List all the components of operating system [2mks]
2. Explain the main purpose of operating system? [3mks] ✓
3. What is meant by arm-stickiness? [3mks]
4. Describe the categories of devices that exist. [3mks] ✓
5. Describe Direct Memory Access. [3mks] ✓
6. What are Buffers? [3mks]
7. Files can be organized in sequential, indexed sequential or direct ways. What are the factors to be considered before an analyst chooses any of these options? [4mks]
8. List and describe the information included in a file descriptor. [4mks] ✓
9. What is the information passed to the channel from the CPU at the start of an I/O command? [2mks]
10. When there is an instruction to read a record from a movable-head disk, the READ instruction is decomposed into a sequence of low-level signals that trigger the step-by-step actions performed by the device and also test the status of the device. Enumerate these signals. [3mks]

SECTION B

- 1(a)(i) Describe the entity that indicates the status of the components of the I/O subsystem. [3mks]
(ii) You are invited to an interview for the position of a system administrator. The interviewer wants you to explain 2 methods the system can use to know when a component of I/O subsystem completes its operation. Explain these methods to the interviewer. [6mks]
- (b)(i) What is the minimum no of instructions an I/O channel can hold? [1mks]
(ii) You are a system designer for a big communication company and a junior system engineer wonders why many I/O control units share only one I/O control channel. Explain to this engineer in a clear way [3mks]
- (c)(i) Under the demanding conditions of a busy computer system, the Device Manager must be able to address some problems in order for it to keep running efficiently. Enumerate these problems. [3mks]
(ii) You are the head of Engineering Department of a big commercial bank and a trainee system engineer wants you to explain to him how device manager handles I/O request. Explain in a way that the trainee will completely understand this concept. [4mks]
- 2(a) Imagine you are one of the candidates invited for an interview for the post of a senior engineer in a busy data processing centre and the MD/CEO who is also an engineer ask you the following questions:
(i) Define seek strategy for I/O device handler? [2mks] ✓

3/12
3/5

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2016/2017 HARMATTAN SEMESTER EXAMINATION

CSC 326 – OPERATING SYSTEM II,

Instruction: Answer Question 1 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

3 UNITS



1. a. Briefly discuss the operating system as
 - i. an extended machine ii. a resource manager

[5 marks]

b. With the aid of diagrams, list and explain the three (3) kinds of file structure. [6 marks]
- c. State the pros and cons of sequential file access and random file access [5 marks]
- d. State and explain four possible file operations [4 marks]
- e. Differentiate between absolute path name and relative path name [1 mark]
- f. Briefly explain the functions of the following:
 - i. Master Boot Record
 - ii. Partition Table
 - iii. Magic Number
 - iv. Super block
2. a. State the three (3) steps involved in removing a file from a UNIX system [4 marks]
- b. State one advantage and one disadvantage each of choosing between small size and large size in a fixed disk-blocking system [4 marks]

A disk of 1MB per track, a rotational time of 8.33 msec and an average seek time of 5msec. What is the time in msec to read a block of 4bytes of data? [8 marks]
3. a. Discuss five areas of concern in a file system backup [5 marks]
- b. Write briefly on the following:
 - i. Write-through cache ii. Block-read ahead iii. Physical dump iv. Logical dump[4 marks]
- c. State one advantage of
 - i. Hard links over symbolic links
 - ii. Symbolic links over hard links[6 marks]
4. a. Citing two examples each, distinguish between block devices and character devices [4 marks]
- b. List five (5) functions of Device-Independent I/O Software [2.5 marks]
- c. Discuss any five goals of the I/O software [7.5 marks]
- d. Arrange the following devices in ascending order of speed
Thunderbolt 2 > Mouse > Keyboard > SATA 3 > Firewire [1 mark]
5. a. State three (3) factors determining the time required to read from and write to a disk
- b. Discuss the following disk seek algorithms
 - i. First Come First Served Algorithm
 - ii. Shortest Seek First Algorithm
 - iii. Elevator Algorithms[1 mark]
[2 marks]
- c. A disk with 40 cylinders receives seven (7) requests to read from cylinders 11, 1, 36, 16, 34, 9 and 12. Find the total seek time of the disk arm if it operates
 - i. First Come First Served seek algorithm
 - ii. Shortest Seek First seek algorithm
 - iii. Elevator seek algorithm[2 marks]
- d. Using (c) above, which algorithm will you advice? Why? [6 marks]
[1 mark]
6. a. Distinguish between:
 - i. security and protection mechanism
 - ii. a threat and an attack
 - iii. virus and worm
- b. Discuss with appropriate areas of application the following security models
 - i. Bell-LaPadula (simple security property and the * property)
 - ii. Biba model (simple integrity property and the integrity * property)[3 marks]
- c. Discuss with the aid of a well - labelled diagram the concept of a Trusted Computing Base (TCB) and the role of reference monitor in ensuring security [6 marks]

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

6 - OPERATING SYSTEM II

Instruction: Answer all questions in Section A and Two questions 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.

Time Allowed: 1 hour 30 minutes

SECTION A

1. List all the components of operating system [2mks]
2. Explain the main purpose of operating system? [3mks]
3. What is meant by arm-stickiness? [3mks]
4. Describe the categories of devices that exist. [3mks]
5. Describe Direct Memory Access. [3mks]
6. What are Buffers? [3mks]
7. Files can be organized in sequential, indexed sequential or direct ways. What are the factors to be considered before an analyst chooses any of these options? [4mks]
8. List and describe the information included in a file descriptor. [4mks]
9. What is the information passed to the channel from the CPU at the start of an I/O command? [2mks]
10. When there is an instruction to read a record from a movable-head disk, the READ instruction is decomposed into a sequence of low-level signals that trigger the step-by-step actions performed by the device and also test the status of the device. Enumerate these signals. [3mks]

SECTION B

- 1(a)(i) Describe the entity that indicates the status of the components of the I/O subsystem. [3mks]
- (ii) You are invited to an interview for the position of a system administrator. The interviewer wants you to explain 2 methods the system can use to know when a component of I/O subsystem completes its operation. Explain these methods to the interviewer. [6mks]
- (b)(i) What is the minimum no of instructions an I/O channel can hold? [1mks]
- (ii) You are a system designer for a big communication company and a junior system engineer wonders why many I/O control units share only one I/O control channel. Explain to this engineer in a clear way why this is so. [3mks]
- (c)(i) Under the demanding conditions of a busy computer system, the Device Manager must be able to address some problems in order for it to keep running efficiently. Enumerate these problems. [3mks]
- (ii) You are the head of Engineering Department of a big commercial bank and a trainee system engineer wants you to explain to him how device manager handles I/O request. Explain in a way that the trainee will completely understand this concept. [4mks]

- 2(a) Imagine you are one of the candidates invited for an interview for the post of a senior engineer in a busy data processing centre and the MD/CEO who is also an engineer ask you the following questions:

- (i) Define seek strategy for I/O device handler? [2mks]



Instruction: Answer question one and any other three

Question 1 (25 marks)

- Imagine that after getting your BSc. degree, you applied for a job as a director of a large computer center that just put its ancient operating system out of pasture and switched over to UNIX. You got the job. Fifteen minutes after starting work, your assistant ran into your office screaming: "some students discovered the algorithm we use for encrypting passwords and posted it on the internet." What should you do and why?
- Name three pitfalls to watch out for when backing up a file system
- What is the difference between a virus and a worm? How do they each reproduce?
- A standard PC can hold only four operating systems at once, is there any way to increase this limit? What consequences would your proposal have?
- Give 5 different path names for the file /etc/password
- Some files begin with a magic number. Of what use is this?

Question 2 (15 marks)

- When a file is removed, its blocks are generally put back on the free list, but they are not erased. Do you think it would be a good idea to have the operating system erase each block before releasing it? Consider both security and performance factors in your answer and explain effect of each
- Consider a system that supports the strategies of contiguous, linked, and indexed allocation. What criteria should be used in deciding which strategy is best utilized for a particular file?
- How do caches help improve performance? Why do systems not use more or larger caches if they are so useful?
- How can we overcome fragmentation?
- Rank the allocation methods on speed

Question 3 (15 marks)

- List three examples of deadlocks that are not related to a computer-system environment
- Some systems automatically open a file when it is referenced for the first time, and close the file when the job terminates. Discuss the advantages and disadvantages of this scheme as compared to the more traditional one, where the user has to open and close the file explicitly
- Give an example of an application that could benefit from operating system support for random access to indexed files.
- If the operating system were to know that a certain application is going to access the file data in a sequential manner, how could it exploit this information to improve performance?

Question 4 (15 marks)

- Some systems provide file sharing by maintaining a single copy of a file; other systems maintain several copies, one for each of the users sharing the file. Discuss the relative merits of each approach.
- In what situations would using memory as a RAM disk be more useful than using it as a disk cache?
- Some file systems allow disk storage to be allocated at different levels of granularity. For instance, a file system could allocate 4 KB of disk space as a single 4-KB block or as eight 512-byte blocks. How could we take advantage of this flexibility to improve performance? What modifications would have to be made to the free-space management scheme in order to support this feature?
- What are the advantages of the variation of linked allocation that uses a FAT to chain together the blocks of a file?

Question 5 (15 marks)

- Consider a file system that uses a modified contiguous-allocation scheme with support for extents. A file is a collection of extents, with each extent corresponding to a contiguous set of blocks. A key issue in such systems is the degree of variability in the size of the extents. What are the advantages and disadvantages of the following schemes?
 - All extents are of the same size, and the size is predetermined.
 - Extents can be of any size and are allocated dynamically.
 - Extents can be of a few fixed sizes, and these sizes are predetermined.
- What are the various kinds of performance overheads associated with servicing an interrupt?
- What are the advantages and disadvantages of supporting memory-mapped I/O to device control registers?
- State and explain three different protection mechanisms

Question 6 (15 marks)

- A password may become known to other users in a variety of ways. Is there a simple method for detecting that such an event has occurred? Explain your answer.
- The list of all passwords is kept within the operating system. Thus, if a user manages to read this list, password protection is no longer provided. Suggest a scheme that will avoid this problem: (Hint: Use different internal and external representations.)
- An experimental addition to UNIX allows a user to connect a watch-dog program to a file. The watchdog is invoked whenever a program requests access to the file. The watchdog then either grants or denies access to the file. Discuss two pros and two cons of using watchdogs for security.

Make a list of six security concerns for a bank's computer system. For each item on your list, state whether this concern relates to physical, human, or operating-system security.

LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

2016/2017 HARMATTAN SEMESTER EXAMINATION

CSC 326 – OPERATING SYSTEM II,

3 UNITS

Instruction: Answer Question 1 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. Briefly discuss the operating system as
 - i. an extended machine ii. a resource manager [5 marks]
 - b. With the aid of diagrams, list and explain the three (3) kinds of file structure. [6 marks]
 - c. State the pros and cons of sequential file access and random file access [5 marks]
 - d. State and explain four possible file operations [4 marks]
 - e. Differentiate between absolute path name and relative path name [1 mark]
 - f. Briefly explain the functions of the following:
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 - iv. Super block [4 marks]
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- b. Discuss the following disk seek algorithms
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- c. Discuss with the aid of a well - labelled diagram the concept of a Trusted Computing Base (TCB) and the role of reference monitor in ensuring security [6 marks]

COURSE CODE: CSC 340 NUMBER OF UNITS: 2

INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER TWO (2) QUESTIONS TIME: 1 1/2 HOURS

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- ✓ Q1 (a) List and explain three general causes of unethical and illegal behaviour [6 marks]
(b) List five (5) challenges to intellectual property rights [5 marks]
* (c) State five (5) steps to be followed in carrying out ethical analysis [5 marks]
(d) State four(4) features of each of the following ethical approaches (i) virtue ethics (ii) utilitarian (iii) fairness (iv) common good [8 marks]
(e) State each of the following candidate ethical principles (i) Golden rule (ii) Decantes rule of change (iii) utilitarian (iv) Risk Aversion (v) No free lunch [6 marks]
- ✓ Q2 (a) List and explain four ways in which people protect their intellectual property [16 marks]
(b) Differentiate between patent and copyright [4 marks]

- ✓ Q3 (a) Briefly discuss each of the following: (i) Information Overload (ii) Information Quality (iii) Digital Divide (iv) Information Anxiety [14 marks]
(b) Why is ethics said not to be universal? [2 marks]
(c) State four differences between law and ethics [4 marks]

Q4(a). Patty works as a programmer in a corporation. David, her supervisor told her to write a program to allow people to post entries directly to the company's accounting files ("the books"). Patty knows that ordinarily programs that affect the books involve several steps, all of which have to balance. Patty realizes that with the new program it will be possible for one person to make changes to crucial amounts, and there will be no way to trace who made these changes, with what justification, or when. Patty raised these concerns to David, who told her not to be concerned, that her job is simply to write the programs as instructed. David said he was aware of the potential mixture of their programs, but he justified his directive by noting that periodically a figure was mistakenly entered in the books, and they needed a way to correct the inaccurate figure. Analyse this scenario from Act-Deontologist and Utilitarian perspectives. [15 marks]

.(b) What is the difference between Hacktivist and Cyberterrorist? [5 marks]

- ✓ Q5.(a) List the different phases of recovering evidence from a computer. Explain each in details. [10 marks]
(b) Computer forensics can be used to investigate a wide variety of computer crimes. Discuss. [10 marks]

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LAGOS STATE UNIVERSITY, OJO, LAGOS

FACULTY OF SCIENCE

COMPUTER SCIENCE DEPARTMENT

COURSE CODE: CSC 326 COURSE TITLE: OPERATING SYSTEM II

SECTION: 2017/2018

TIME: 2HRS

UNITS: 3

INSTRUCTION: ANY FOUR QUESTIONS

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

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- ✓ a List and explain the classes of external devices that engage in I/O with computer (7 marks)
- ✓ b Explain with examples the classes of I/O devices (5 marks)
- ✓ c Using a tabular format, explain the relationship between the techniques of I/O (5.5 marks)
- ✓ a. With the aid of diagram explain how a DMA module act as a surrogate processor (6.5 marks)
 - b Is the idea of using a DMA module as a surrogate processor efficient or not. Give reason if your answer is yes, and if No give reason and how it can be improved. (6 marks)
- ✓ c Highlight and explain the two major design objectives of I/O devices. (5 marks)

- ✓ a. Highlight and explain the typical operations that can be performed on a file (4.5 marks)
- ✓ b. State the criteria's that must be considered while choosing a file organization method (3 marks)
- ✓ c. Highlight and explain five methods of file organization (5 marks)
- ✓ d. List and explain five access right that can be assigned to a particular user (5 marks)

4. a) Explain concurrency in terms of :

- i. Single processor multiprogramming (3 marks)
- ii. Multiple processor multiprogramming (3 marks)

b. Consider the procedure below and answer the questions that follow:

```
Void echo()
```

```
{
```

```
Chin = getchar();
```

```
Chout = Chin;
```

```
Putchar(chout);
```

```
}
```

i. How can sharing among processes lead to problem in the above procedure, considering the fact that chin is the global resource. Using P1 and P2 as examples of processes that share the global variable, explain the sequence of instructions involved when p1 and p2 interrupts each other in the critical section (6.5 marks)

ii. Explain how the problem stated above can be averted, use this corrective measure to correct the interruption of P1 and P2 . (5 marks)

✓ 5. a. i. Differentiate between sequential and concurrent program (3 marks)

ii. Why is concurrency necessary in computing (2 marks)

✓ b. i. A computer engineer intends incorporating concurrency into the design of his operating system, State the operating system concerns that must be taken into consideration about the existence of concurrency by the engineer (2.5 marks)

ii. Highlight the problem that arise as a result of concurrency (2 marks)

iii. Explain any three of the problems listed above (3 marks)

✓ c. i. Highlight the various means of controlling concurrency problems (3 marks)

ii. Explain one of the control measures stated above (2 marks)

6. a. Explain the concept of process in terms of :

- i. Resource ownership (2 marks)
- ii. Scheduling/Execution (2 marks)

b. With the aid of diagram explain how a stream of data that is on queue for execution will be executed by each the following threading approaches.

i. One process one thread (2 marks)

ii. One process Multiple threads (2 marks)

iii. Multiple processes one thread per process (2 marks)

iv. Multiple processes Multiple thread per process (2 marks)

c. i. Highlight two approaches to providing parallelism by replicating processors (2 marks)

ii. Explain any one of the approaches listed above (2 marks)

iii. Define a microkernel (1.5 marks)

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LAGOS STATE UNIVERSITY, OJO, LAGOS
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
2017/2018 RAIN SEMESTER EXAMINATION
CSC 212/328 – COMPUTER ARCHITECTURE 3 UNITS

Instruction: Answer any Four (4) Questions

Time Allowed: 2 hour

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 1 (17.5 Marks)

- a. Define Computer Architecture (3 Marks)
- b. State five reasons for studying computer Architecture (5 Marks)
- c. Explain difference between fixed points notation and floating point notation (5.5 Marks)
- d. Explain Flynn's classification (4 Marks)

Question 2 (17.5 Marks)

- a. Explain classification of computer architecture (4 Marks)
- b. Write short note on these following
 - (i) Vector processor (ii) Scalar processor (iii) Vector processing (9 Marks)
- c. State Amdahl's law and prove it (4.5 Marks)

Question 3 (17.5 Marks)

- a. Write a program using Assembly Language to evaluate arithmetic expression below

$$X = (A - B) + C * (D * E - F)$$

$$G + H * K$$

- i. Using a general register computer with three addresses instruction (4 Marks)
- ii. Using a general register computer with two address instruction (4 Marks)
- iii. Using a stack organized computer with zero address instruction (2 Marks)
- b. Discuss five (5) types of Addressing mode (7.5 Marks)

Question 4 (17.5 Marks)

- a. Explain terms of Instruction format (3 Marks)
- b. The memory unit of a computer has 256k word of 32 bits each. The computer has an instruction format with four fields, an operation code field, a mode field to specifying one of the seven addressing modes, a register address field to specify one of 60 processor registers, and a memory address. Specify the instruction formats and number of bits in each field of the instruction in one word memory (9 Marks)
- c. Derive the basic CPU performance equation (5.5 Marks)

Question 5 (17.5 Marks)

- a. Explain register organization (3.5 Marks)
- b. State five (5) types of register (5 Marks)
- c. Define the following terms (i) Scalability (ii) Speed-up (iii) Parallel computer (9 Marks)

Question 6 (17.5 Marks)

- 6(i) Compare CISC and RISC Architecture (6 Marks)
- (b) Distinguish between SRAM and DRAM (6 Marks)
- (c) Show cache addressing for a byte – addressable memory with 32-bit cache line W = 16B cache size L = 4096 line (64kb) (5.5 Marks)

LAGOS STATE UNIVERSITY, OJO, LAGOS
FACULTY OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
2017/2018 RAIN SEMESTER EXAMINATION

CSC 322 – FUNCTIONAL PROGRAMMING

3 UNITS

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

Time Allowed: 1 hour 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. Closure is a modern variant of LISP. Justify this statement using five (5) comparisons with the traditional LISP (5marks)

b. i. Name 10 functional programming languages that were built to run on the JAVA Virtual Machine. (4 marks)

ii. Which other three (3) languages have implementation that runs on the Java Virtual Machine (4 marks)

c. What is tail recursion optimization? Show how Closure mimics tail recursion optimization. (4 marks)

d. What is hash in Compojure (2 marks)

e. Write short note on how SPECIAL FORMS are treated in Closure (5 marks)

f. Write short note on ATOMS with emphasis on its conditional behavior (4 marks)

g. Discuss the Flow Control of a Function (4 marks)

h. What is difference between Closure and Closure Script. (3 marks)

i. Write a function which returns the values for the roots of a given Quadratic Equation.(5marks)

2. a. Write a function sdsu-partial which will act like clojure's partial. Sdsupartial takes a function f and one other argument x. Assume that the function f requires two arguments. Sdsu-partial returns a function that takes one argument y. When called, the returned function calls (f x y).(5marks)

b. What is REPL? (3 marks)

c. Keywords are Cached and Interned. Discuss (3 marks)

d) Closure data structure are of two categories, name them and explain how these categories are used.? (4 marks)

3. a. What is clojure.main namespace in clojure (3 marks)

b. What is a Clojure Collection (5 marks)

c. What are the four(4) file extensions in Clojure? (4 marks)

d. What is a Trampoline Function? (3 marks)

4. a. Write a function which returns false if the given sequence is a palindrome.(3marks)

Hint: "madam" does not equal '(m\ a \d \ a \ m)

b. What is the use of Clojure libs, write short note on Noir by Chris Granger (3marks)

c. What is the stable version of Clojure and when was it released (5marks)

d. What are the Clojure Variables (4 marks)

5. a. Given an Anagram, Write a function which takes a sequence of words, and returns true if they fully the true meaning of an Anagram. (8 marks)

b. What is the result of evaluating each of the following? They are evaluated one at a time.(7 marks)

(ns clojure.examples.hello

(def x (float(/ 2 1)))

(:gen-class))

(println x)

; This program displays Hello World

(defn Example []

(def x (inc 2))

(def x (+ 2 2))

(println x)

(println x)

(def x (- 2 1))

(def x (dec 2))

(def x (* 2 2))

(println x)

(println x)

(def x (max 1 2 3))

(println x)

LAGOS STATE UNIVERSITY, OJO
FACULTY OF SCIENCES
DEPARTMENT OF COMPUTER SCIENCE
SECOND SEMESTER EXAMINATION 2017/2018 SESSION

Course Title: Compiler Construction

Course Code: CSC 320 (3 Units)

Time Allowed: 2 Hours

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.

Instructions: Answer any four Questions in all

- and Syntax analysis*
- ✓ 1a / (i) Briefly describe the term parse tree as used in compiler design (2 mks)
 (ii) With the aid of good diagram, explain the major activities taken place between the lexical (4½ mks)
- b Construct parse tree for: (i) $E \rightarrow E + E \mid E * E \mid id$ (ii) $s \rightarrow SS^* \mid ss^* \mid a$ (4 mks)
- c. Write short notes on the following Specifications of Tokens:
 (i) Alphabets (ii) Strings (iii) Special Symbols (iv) Language (6 mks)
- ✓ 2a What is difference between the following pairs? (4 mks)
 (i) parse tree and syntax tree? (ii) top down parsing and bottom up parsing?
- b. (i) What is the major role of parser in compiler? (2 mks)
 (ii) With the aid of a good diagram, describe two phases of compiler based on the way they compile. (5½ mks)
- c. There are a number of algebraic laws that are obeyed by regular expressions, which can be used to manipulate regular expressions into equivalent forms. State various operations on languages (6 mks)
- 3a If r and s are regular expressions denoting the languages $L(r)$ and $L(s)$, state the expression for the following notations: (i) Union (ii) Concatenation (iii) Kleene closure (4½ mks)
- b. If x is a regular expression in a programming language, state the following valid tokens representation:
 (i) x^* (ii) x^+ (iii) $x^?$ (4½ mks)
- c. (i) Define compiler and state its types (3 mks)
 (ii) What is YACC in compiler design? (2½ mks)
 (iii) Distinguish between SLR(1) and LR(0) as used in compiler design (3 mks)
- ✓ 4a (i) What is three address code in compiler design? (2 mks)
 (ii) Briefly describe the term token as used in yacc? (2½ mks)
- b. Outline six applications of compilers (6 mks)
- c. (i) Enumerate four differences between compiler and interpreter (4 mks)
 (ii) The cross-compiler is used to implement the compiler, characterized by three languages, state these three languages (3 mks)
- ✓ 5a (i) A finite automaton (M) is an abstract machine that serves as a recognizer for the strings that comprise a regular language and is defined by using five (5) tuples. State and briefly describe finite automata (M) symbols (5 mks)
 (ii) The lexical structure of more or less every programming language can be specified by a regular language. Outline three common ways to implement a lexical analysis in a finite state machine design (3 mks)
- b. (i) State the structure in each of Lex & Yacc program in compiler design (4 mks)
 (ii) With the aid of diagram only, describe the lexical analyzer generator (3½ mks)
- c. Differentiate between Linker and Loader in compiler design (2 mks)
- 6a In tabular form, explain Noam Chomsky classification of four classes of languages using (7½ mks)
 (i) Type of Grammar (ii) Restriction on $G = (N, T, P, S)$ (iii) Advantages and Disadvantages
- b. (i) What are the four components of a context-free grammar (4 mks)
 (ii) Given the context free grammar with productions rules: $A \rightarrow A + A \mid A - A \mid A * A \mid a$ Determine if the above production is ambiguous or not using suitable parse tree to generate the string $a + a - a$ (3 mks)
 (iii) Consider the production rules: $E \rightarrow E + E \mid E - E \mid id$ Generates the available parse trees for the string $id + id - id$, for the grammar in 6b (iii) above (3 mks)