FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY
2018/2019 Academic Session - First Semester Examinations
ITC2321, CBS2321 & SWE2302: Discrete Structure

Instructions: *Attempt Five (5) Questions* Time Allowed: *3 Hours*

1. a) If a | b and a | c, then show that a | b ± c *(∀ a, b, c ∈ ℤ).* [4 Marks]
   b) A Division Algorithm state that: Given any integers *a* and *b* with $b \neq 0$, there exist unique integers *q* (*"quotient"*) and *r* (*"remainder"*) such that $0 \leq r < |b|$ and $a = bq + r$. Use the above Algorithm to compute the greatest common divisor *gcd(206, 73).* [6 Marks]
   c) State and prove DeMorgan's Laws. [4 Marks]

2. a) The of Law of syllogism state that: $[(P \rightarrow Q) \wedge (Q \rightarrow R)] \rightarrow (P \rightarrow R)$, show that the law is always true. [4 Marks]
   b) Show that $P \vee (Q \wedge R)$ and $(P \vee Q) \wedge (P \vee R)$ are logically equivalent. [4 Marks]
   c) Construct a truth table for $(\sim Q \wedge \sim R) \leftrightarrow (\sim P \rightarrow (Q \vee R))$. [5 Marks]

3. a) Show that the square matrix $B = \begin{pmatrix} 3 & 2 & 4 \\ 1 & 5 & 3 \\ -1 & 8 & 2 \end{pmatrix}$ is a singular matrix. [4 Marks]

   b) If $A = \begin{pmatrix} -2 & 3 & 1 \\ -3 & 2 & 0 \\ -2 & 1 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 0 & 3 \\ 3 & 2 & 1 \\ 1 & 3 & 0 \end{pmatrix}$
   i. Find $A*B$ [5 Marks]
   ii. Find A^T*B [5 Marks]

4. a) If $A = \begin{pmatrix} 2 & -1 & 1 \\ 3 & -2 & 2 \\ 4 & 2 & -1 \end{pmatrix}$ Find A^{-1} and $A*A^{-1}$ [8 Marks]
   b) Solve the below set of linear equations by a matrix method.
   $x_1 + x_2 + x_3 = 2$
   $2x_1 - x_2 + 3x_3 = -3$
   $3x_1 + 2x_2 + 4x_3 = 3$ [6 Marks]

5. a) If $B = \begin{pmatrix} 1 & -5 & 3 \\ 3 & 4 & -2 \\ 0 & -1 & 2 \end{pmatrix}$ find *adj B* [5 Marks]

   b) For the following set of simultaneous equations.
   $x_1 + 3x_2 + 2x_3 = 3$
   $2x_1 - x_2 - 3x_3 = -8$
   $5x_1 + 2x_2 + x_3 = 9$
   i) Form the augmented coefficient matrix. [2 Marks]
   ii) Solve the set of equations by Gaussian elimination. [7 Marks]

6. a) For $a, b \in \mathbb{R}$ define $a \simeq b$ to mean $a - b \in \mathbb{Z}$. Prove that the $\simeq$ is an equivalence relation on $\mathbb{R}$. [5 Marks]

   b) Prove that the congruence modulo *n* is an equivalence relation on $\mathbb{Z}$. [5 Marks]
   c) Find all integers *x* such that $7x \equiv 2x \pmod 8$. [4 Marks]

7. a) Use the Principle of Induction to prove the following results.
   i. $\sum_{j=1}^{n} j^3 = \frac{n^2(n+1)^2}{4}$ [5 Marks]
   ii. $\sum_{i=1}^{n} x^i = \frac{1-x^{n+1}}{1-x}$ *(for $x \neq 1$ and integers $n \geq 0$)* [5 Marks]

   b) Express the following in summation notation.
   i. 1 + 6 + 27 + 126 + 626. [4 Marks]

BAYERO UNIVERSITY, KANO
FACULTY OF COMPUTER SCIENCES AND INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE
CSC2323- Discrete Structures Test

Instruction: Answer all questions Time Allowed: 35 Minutes Type A

1. Use **Gauss-Jordan Method** to solve the following system of linear equation

$$3x_1 + 3x_2 + 4x_3 = 1$$
$$2x_1 + 4x_2 - 2x_3 = 2$$
$$2x_1 + x_2 + 4x_3 = 2$$

2. Show that the product of two odd integers is odd whereas the product of two integers is even if either of the integers is even
3. Using Euclidean Algorithm, find the greatest common divisor of 1491 and 2331

BAYERO UNIVERSITY, KANO
FACULTY OF COMPUTER SCIENCES AND INFORMATION TECHNOLOGY
DEPARTMENT OF SOFTWARE ENGINEERING
SWE 3301/2301-(INTRODUCTION TO SOFTWARE ENGINEERING)
2019/2020 TEST
Instruction: Attempt All

Time Allowed: 45 mins

1. **a.** Why do we need Software Engineering? List two (2) main issues that affect all type of software systems. **(5 marks)**

   b. Mention three (3) differences and two (2) similarities between Iterative Enhancement Model and RAD Model. **(5 marks)**

   c. Briefly explain any (2) stages of the Requirements Engineering Process **(5 marks)**

2. **a.** Software Engineers must design the modules of a system with the goal of **low Coupling** and **high Cohesion**. Why? **(5 marks)**

   b. Mention two (**2**) advantages and two (**2**) disadvantages of the Client-Server Architectural Pattern **(5 marks)**

   c. Mention three (**3**) types of System Models and give examples of diagram(s) used in each model. **(5 marks)**

...hours ...ENGINEERING)

...of five (5) questions in all. ...four (4) questions from Section B giving a

Section A: Answer all

1. You are asked to develop an Online Shopping System for MIMSAH organization. The system shall enable a user to browse a catalog, select items, place order and make payment. The user can also contact the organization through a phone call to confirm the status of the order. The Admins of the organization are responsible for uploading new items and maintaining the system.
   a. Draw a context diagram based on the above description. **(5 marks)**
   b. Draw a use case diagram based on the above description. **(5 marks)**
   c. Draw an activity diagram for the system. The procedure for using is given below: **(4 marks)**

   Once a user enters the MIMSAH site, the system will display the products catalog. The user searches through it and only select an item if it is desired. The user then proceed to add the selected item to cart. If the user finishes adding all selected items to cart, he/she can then proceed to place order and make payment. If the payment is successful, the system generates an invoice and display it for user.

Section B: Answer any four (4) questions

2. a. Define Software Engineering. Mention (2) aspects of its importance **(3 marks)**
   b. Write short notes on the following terms: **(8 marks)**
   i. Software Engineer ii. Generic products ii. Customized products iv. System Engineering
   c. Mention the three (3) main issues that affect all type of software systems. **(3 marks)**
3. a. Mention four (4) activities that are common to all software processes **(3 marks)**
   b. With the help of diagrams, give one example each of a plan and an agile software development life cycle. **(8 marks)**
   c. Mention three (3) differences between plan-driven and agile driven development **(3 marks)**
4. a. Define the term Software Prototyping. Mention two (2) aspects of its benefits **(3 marks)**
   b. Explain the following terms: **(8 marks)**
   i. Feasibility study ii. Requirement Elicitation iii. Requirement Specification
   c. State the three (3) ways in which the requirements of a system can be documented **(3 marks)**
5. a. Define the term Software Architecture. Mention two (2) advantages of Architectural Design **(3 marks)**
   b. Briefly explain the following terms: **(5 marks)**
   i. Modularity ii. Architectural Styles
   c. List four (4) types of System Model and give examples of diagram used in each model. **(6 marks)**
6. a. Mention any three (3) factors to consider when selecting a Programming Language and briefly explain one of them **(3 marks)**
   b. Write short notes on the following terms: **(8 marks)**
   i. Program testing ii. Unit testing iii. Performance testing iv. Requirement based testing
   c. What is User Testing? Mention the three (3) types of User testing **(3 marks)**
7. a. Mention four (4) problems that are encountered during Software Maintenance **(3 marks)**
   b. Explain the following terms: **(8 marks)**
   i. Corrective Maintenance ii. Project Planning iii. Risk Management
   c. State three (3) critical factors that project managers need to uphold when managing people **(3 marks)**

BAYERO UNIVERSITY, KANO
FACULTY OF COMPUTER SCIENCES AND INFORMATION TECHNOLOGY
DEPARTMENT OF SOFTWARE ENGINEERING,
2019/2020 First Semester Examinations
SWE 3301/2301- (INTRODUCTION TO SOFTWARE ENGINEERING)
Instruction: Attempt a total of five (5) questions.
Time Allowed: 3 Hours

1. a. Define the term Software Engineering. Mention any three (3) software crises that lead to establishment of Software Engineering. (5 marks)
   b. Write short notes on the following issues that affect all software types: (6 marks)
   i. Business and Social Change ii. Security and Trust iii. Heterogeneity
   c. Mention three (3) Software Engineering Principles. (3 marks)
2. a. Define the term Software Process. Briefly explain the Plan Driven Development approach to software development. (5 marks)
   b. Mention three (3) differences and three (3) similarities between Iterative Enhancement Model and RAD Model. (6 marks)
   c. Before embarking on any software project, it is necessary to conduct a feasibility study, why? (3 marks)
3. a. Explain the following stages of Requirements Engineering: (6 marks)
   i. Requirement Elicitation and Analysis ii Requirement Specification
   b. Mention two (2) advantages and one (1) disadvantage of the following architectural patterns: (5 marks)
   i. Client-Server ii. Pipe and Filter
   c. Software Engineers must design the modules of a system with the goal of low Coupling and high Cohesion. Why? (3 marks)
4. a. What are System Models? List any two (2) perspectives that a system can be modeled (3 marks)
   b. Write short notes on the following System Models and give examples of diagram(s) used in each model. (6 marks)
   i. Interaction Model ii. Behavioral Model
   c. With the aid of diagrams, differentiate between Context Diagram and Class Diagram. (5 marks)

5. a. Implementing software systems involves some processes. Discuss the processes to a layman (5 marks)

b. List and discuss any 3 factors to consider in selecting Traditional Programming Language (6 marks)

c. Briefly explain Software Application Types (3 marks)

6. a. As a software Engineer explain the reasons behind System testing. (5 marks)

b. With the aid of diagrams, discuss the three level of testing you now (6 marks)

c. What is the importance of system maintenance (3 marks)

7. a. Discuss the three types of Risk (5 marks)

b. List and explain the three types maintenance you know (6 marks)

c. List any three responsibilities of a project manager (3 marks)

BAYERO UNIVERSITY, KANO

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCES,

2017/2018 First Semester Examinations

CSC2253/CSC2251 - (Data Structures and Algorithms)

Instruction: Answer Any Four (4) Questions Time Allowed: 2 Hours

1) a. Write a short note on the following:
   i. Stack ii. Queue
   b. Give the postfix expression of the infix expression
   A+(B*C-(D/E^F)*G) *H
   c. Consider the following queue of characters, where QUEUE is a circular array which is allocated six memory cells:
   FRONT=1, REAR= 3 QUEUE = --, A, C, D, --, --
   What is the state of the queue after performing the following operations?
   F is added to the queue
   two letters are deleted
   K, L, M are added to the queue
   Two letters are deleted
   R is added to the queue
   Two letters are deleted
   S is added to the queue
   Two letters are deleted
   One letter is deleted

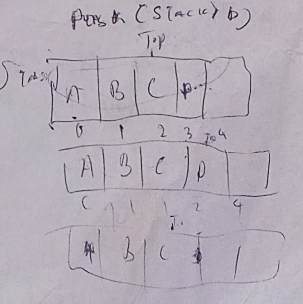
(Show the state of the queue after each operation)

2) a. what is the infix expression of the given Postfix expression: **AB/C*EFG*H/+D-+**
   b. ABC +* CBA-+* is a postfix expression with the assumption A = 1, B = 2, and C = 3. If the above postfix expression is evaluated, the final stack value is?
   c. Show that ({{(A+B)-(CxD)}}) is a valid expression.

3) a. Consider the following pseudo code:

```
declare a stack of characters
while (there are more characters in the word to read)
{
read a character
push the character on the stack
}
while (the stack is not empty)
{
write the stack's top character to the screen
pop a character off the stack
}
```

What is written to the screen for the input "structure"? Show the state of the stack after each



operation.

b. Suppose we have an array implementation of a stack, with ten items in the stack stored at data[0] through data[9]. The CAPACITY is 20. Where does the push member function places the new entry in the array?

4) a. The following list of names is assigned (in order) to a linear array INFO:
Mary, Jamil, Bashir, Pascal, Dahiru, Anna, Khalid, Nabil, Rukayya, Eileen
That is INFO[1]= Mary, INFO[2]= Jamil, …, INFO[10]= Eileen. Assign values to an array LINK
and a variable START so that INFO, LINK and START form an alphabetical listing of the names.

b. A Professor keeps a class list containing the following data for each student:
Name, Registration Number, Course, Test scores, Final grade
i. state the entity, attributes and entity set of the list.
ii. Describe the field values, records and file.
iii. Which attribute can serve as a primary key for the list?

5) a. List and explain four (4) data structure operations you know.
b. Convert the following Infix expression into a Postfix expression:
(A-B) – C + D * E + F
c. In a large university where the resources are limited, students must sign a waiting list i all the terminals are occupied. The student who has been waiting at a terminal the longes is forced off first, and the student who has been in the waiting list the longest is the next user to be allowed on.
What is the most suitable data structure to apply to the above phenomena? Justify your answer.

6) a. Construct the binary three with the following traversal sequences
Post-order: 9, 7, +, 5, 4, +, -, 15, 3, +, 2, -, *
In-order: 9, +, 7, -, 5, +, 4, *, 15, +, 3, -, 2
b. Explain any two (2) advantages of a link list.

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCES,
2020/2021 First Semester Examinations
CSC2253/CSC2251/SWE2303 - (Data Structures and Algorithms)
Instruction: Answer Any Four (4) Questions Time Allowed: 2 Hours

1) a) Consider the general Tree T in Figure 1. Find the corresponding binary tree T'. (6 marks)

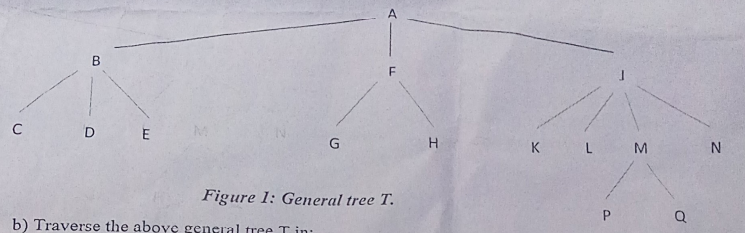


Figure 1: General tree T.

b) Traverse the above general tree T in:
(i) Preorder (ii) Post-order (6 marks)
c) Give the In-order algorithm for traversing a binary tree T. (5.5 marks)

2) a) Suppose the following sequences list the nodes of a binary tree T in preorder and in-order, respectively:
Pre-order: G,B,Q,A,C,K,F,P,D,E,R,H
In-order: Q,B,K,C,F,A,G,P,E,D,H,R
Draw the diagram of the tree. (5.5 marks)
b) Draw the binary tree corresponding to each of the following algebraic expressions:
i) $E_1 = (a-3b)(2x-y)^3$ (4 marks)
ii) $E_2 = (2a+5b)^3(x-7y)^4$ (4 marks)
c) Give the pre-order traversal of each of the trees. (4 marks)

3) a) Consider the graph G in figure 2.

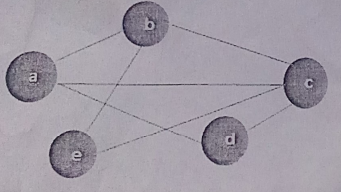


Figure 2: Graph G

i) Describe G formally in terms of its set V of nodes and its set E of edges. (2.5 marks)
ii) Find the degree of each node. (5 marks)
b) i) Give the breadth-first search algorithm for traversing a graph. (3 marks)
ii) Use the algorithm to traverse the above graph. (3 marks)
c) What is the adjacency matrix representation of the graph in figure 2? (4 marks)

4) a) An automobile company uses an array SIMPLE to record the number of automobile sold each year from 1956 through 2010. What is the length of this array? (4 marks)
b) ABC +* CBA-+* is a postfix expression with the assumption A = 2, B = 3, and C = 4. If the above postfix expression is evaluated, the final stack value is? (7 marks)

c) Show that {(({(A+B)-(CxD)}))} is a valid expression.

5) a) Consider the following queue which can be allocated eight integers and five operations. **(6.5 marks)**

front = 3 rear= 5 Queue = - , - , 2 , 4 ,5, - , - , -

(for notational convenience " – " used to denote an empty cell)

The following operations have to be performed.

(i) 6 is added to the queue.

(ii) Two elements are deleted from the queue.

(iii) 10 and 12 are added to the queue.

(iv) Two elements are deleted from the queue.

(v) 2 and 3 are added to the queue.

What are the final front and rear values when the above operations are performed into a circular queue?

(Show the state of the stack after each operation)

b) Explain any two (2) advantages of a link list. **(10 marks)**

c) With the aid of diagrams, differentiate between Linked List and Stack **(2 marks)**

6) a) Convert the Expression **(A+ B) * C + D/(E + F * G) – H + (I ^ (J * K))** from infix to postfix. **(5.5 marks)**

b) I have implemented queue with a linked list, keeping track of a front pointer and a rear pointer. Use example to show that both pointers will change during insertion into the EMPTY queue. **(10 marks)**

c) Write an algorithm for inserting a node between two nodes in a singly linked list. **(4 marks)**

(3.5 marks)

ITC2203: (Introduction to Information Technology in Business) Test

Instructions: *Attempt All Questions, Each Question Carries One (1) Mark* **Time Allowed:** *20-Minute*

Name: ONYEKA JOHNSON IFEANYI Reg. No: CSC/17/IFS/00042

16

1. _____ is a market in which vendors offer goods and services specific to an industry, trade, profession or other group of customers with the specialized needs
   A) Horizontal market
   B) Vertical market
   C) e-market
   D) e-business

2. A market in which makers offer a non-specific, broad range of goods and services to a large group of customers is called:
   A) e-market
   B) Vertical market
   C) Horizontal market
   D) e-business

3. The process of buying and selling of goods and services through wireless technology, for example handheld devices such as cellular telephone is called:
   A) e-business
   B) e-commerce
   C) e-market
   D) m-mobile

4. The interconnection of Networks is sometimes called:
   A) Internet
   B) Network
   C) LAN
   D) WAN

5. The use of computer to store, retrieve, transmit, and manipulate, data or information, often in the context of a business is called:
   A) Information technology
   B) ICT
   C) e-commerce
   D) e-business

6. One of the following is an *advantage* of e-commerce
   A) Technology
   B) Reduction in communication cost
   C) Good delivery
   D) Cash on delivery

7. Which of the following is *not* an important of e-commerce?
   A) Reduction in communication cost
   B) Cheaper customer service
   C) Low-cost technological infrastructure
   D) Availability

8. A _____ is a collection of computers or computer-like devices that can communicate across a common transmission medium
   A) Internet
   B) Intranet
   C) Network
   D) Extranet

9. The world wide web is sometime called:
   A) Web
   B) Internet
   C) Network of networks
   D) Tim Berners-Lee

10. A network topology in which the whole system relies on the central controller is called:
    A) Mesh topology
    B) Star topology

C) Ring topology
D) Bus topology

11. A network that is used to link business partners, who conduct frequent business transactions with an organization is called:
A) Internet
B) Extranet
C) Intranet
D) Network

12. _____ is the use of a unique ID and password to access the extranet
A) Encryption
B) Integrity check
C) Authorizations
D) Confidentiality

13. Assume one (1) device is connected using mesh topology how many cables required using half-duplex
A) 3
B) 2
C) 1
D) 0

14. Walkie-talkies is an example of _____ mode of transmission
A) Simplex
B) Half-duplex
C) Duplex
D) Full-duplex

15. If five devices are arranged in mesh topology, how many cables needed using duplex?
A) 10
B) 20
C) 30
D) 40

16. _____ is the transformation of an organization's processes to deliver additional customer value through the application of technologies, philosophies and computing paradigm of the new economy
A) e-commerce
B) e-business
C) e-market
D) m-commerce

17. A private network based on Internet protocols such as TCP/IP but designed for information management within a company or organization is called:
A) Internet
B) Intranet
C) Extranet
D) Network

18. _____ is simply a web site where buyers and sellers interact with each other and conduct transactions
A) e-commerce
B) e-business
C) e-market
D) m-commerce

19. _____ is an e-commerce between companies
A) B2B
B) B2C
C) B2G
D) CBC

20. Which of the following is ***not*** a major segment of internet economy?
A) Physical ICT infrastructure
B) Business infrastructure
C) Commerce
D) Capital

BAYERO UNIVERSITY, KANO
FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY
2018/2019 Academic Session - First Semester Examinations
ITC2203: Introduction to Information Technology in Business

Instructions: *Attempt 4 Questions* Time Allowed: *2-Hour*

1. a) Define the term e-commerce. [3 Marks]
b) Briefly explain all the types of e-commerce. [10 Marks]
c) Briefly Explain vertical market and horizontal market [4.5 Marks]

2. a) Define Supply Chain Management (SCM). [4 Marks]
b) Briefly explain the three main flows in SCM. [9 Marks]
c) Briefly explain e-market [4.5 Marks]

3. a) Define the term internet economy. [4 Marks]
b) Differentiate between e-business and internet economy. [4.5 Marks]
c) Briefly explain the three major segments of internet economy. [9 Marks]

4. a) With the aid of diagram explain an old economy relationship and new economy relationship. [8 Marks]
b) Explain the advantages of new economy relationship over old economy relationship. [6 Marks]
c) Briefly explain the two primary components of B2B e-commerce. [3.5 Marks]

5. a) What are major forces that are fueling e-commerce? [9 Marks]
b) Explain the importance of intranet to e-commerce. [2.5 Marks]
c) Explain data transaction security components. [6 Marks]

6. a) Briefly explain three authorization schemes. [6 Marks]
b) Explain all types of data flow and give an example of each. [6 Marks]
c) Assume n devices are connected using mesh topology, what is the number of cable links required?
i) Using half duplex. [3 Marks]
ii) Using full duplex. [2.5 Marks]

INFORMATION TECHNOLOGY, ... TECHNOLOGY

2020/2021 First Semester Examinations

CSC2233/ITC2201/SWE2206 - Introduction to Web Computing

Instruction: *Answer any four (4) questions*

Time Allowed: 2 Hours

1. a. Write the HTML markup for the skeleton of HTML page. *5 marks*
   b. Distinguish between the Internet and the Web. *5 marks*
   c. Explain web client and web server. *5 marks*

2. a. What is the difference between HTML elements and tags? *3 marks*
   b. Differentiate container element with stand-alone element. *4 marks*
   c. Write the HTML markup that produces the following: *8 marks*

What's your take of web design?

1. HTML is fun.
   a. Yes it is.
   b. No, it is not.
2. And CSS is fun too.
   a. Just fun.
   b. Funny

3. a. Explain the roles of HTML and CSS in the design of website. *3 marks*
   b. With example, briefly explain how you insert the following on a web page"
      i. image/picture. *2 marks*
      ii. video. *2 marks*
   c. Write the html code for the following: *8 marks*

Student Form

First name:

Last name:

Gender:
- Female
- Male

4. a. Draw the output of the following HTML Markup: *7 marks*

```
<h1>Departmental Courses</h1>
<table border=1>
    <thead>
        <th>SN</th>
        <th>Courses</th>
        <th>Department(s)</th>
    </thead>
    <tbody>
        <tr>
            <td>1</td>
            <td rowspan=2>ITC2201</td>
            <td>SWE</td>
        </tr>
        <tr>
            <td>1</td>
            <td>CS</td>
        </tr>
    </tbody>
</table>
```


   b. Write the HTML Markup that produce each of the following:
      i. 21th February, 2021. *2 marks*
      ii. HTML & CSS *2 marks*
   c. Write the CSS rules syntax. *4 marks*

5. a. Describe how an image "*background.png*" can be made as a background picture. *4 marks*
   b. What are the purpose of colspan and rowspan in tables? *3 marks*
   c. Write the HTML markup that produce the table below. *8 marks*

Time Table

Day	9 -10 am	10 - 11am
Monday	ITC2201	SWE2206
Tuesday	ITC3304	

6. a. With examples, explain how definition list differs from ordered list. *5 marks*
   b. List and explain the two types of hyperlinks. *4 marks*
   c. Explain the purpose of the following forms attributes; method, action and target. *6 mark*

DEPARTMENT OF INFORMATION TECHNOLOGY
2020/2021 Academic Session - First Semester Examinations
ITC2203: *Information Technology in Business*
CSC3242: *Information Systems I*

Instructions: *Attempt four (4) questions*

Time Allowed: *2 Hours*

1. a) What's data flow? *[4 Marks]*
   b) Explain the three *(3)* types of data flow and give an example of each. *[9 Marks]*
   c) A network is a collection of two *(2)* or more devices capable of sharing information or resources.
   In mesh topology we can find the number of cables in a full duplex using the formula $n(n-1)/2$. use the formula to show and explain that when we have one *(1)* device we cannot have a network. *[4.5 Marks]*

2. a) Assume, you are hired in a company to provide a secured and strong network connection within the company.
   Explain in details which network will you choose? *[6 Marks]*
   b) With the aid of diagram explain how Virtual Private Network (VPN) works. *[5.5 Marks]*
   c) Explain three *(3)* advantages of Virtual Private Network (VPN). *[6 Marks]*

3. a) Explain e-commerce. *[4 Marks]*
   b) Differentiate between e-commerce and e-business. *[4 Marks]*
   c) Explain four types of e-commerce. *[9.5 Marks]*

4. a) Explain five *(5)* components of a typical successful e-commerce transaction loop. *[8 Marks]*
   b) Explain the impotence of intranet to the e-commerce. *[5.5Marks]*
   c) Explain the advantages of e-commerce for businesses. *[4 Marks]*

5. a) What's Supply Chain Management (SCM)? *[4 Marks]*
   b) Explain main flows in Supply Chain Management (SCM). *[5.5 Marks]*
   c) With the aid of diagram explain the old and new economic relationship. *[8 Marks]*

6. a) Explain Electronic Payment System (EPS). *[3 Marks]*
   b) Explain the challenges that are facing Electronic Payment System (EPS). *[5.5 Marks]*
   c) Explain the differences between Extranet and Intranet. *[5 Marks]*
   d) Explain two (2) forms of consumer-to-consumer (C2C) e-commerce. *[4 Marks]*

BAYERO UNIVERSITY, KANO
FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
DEPARTMENT OF INFORMATION TECHNOLOGY
ITC2203: *Information Technology in Business*

Time Allowed: *30 Mins*

Instructions: *Attempt all questions*

3. a) What's an Electronic Payment System (EPS)?
   b) Explain why even in the most developing countries they are still cash-based economies?
   c) *Suppose, a company engaged a supplier, and the company wants give the supplier an access to its private network. As an analyst what type of network will you suggest the company to use in order to provide secure and reliable communications between the supplier and the company?*

4. a) What's data flow?
   b) Explain the three (3) types of data flow and give an example of each.
   c) With the aid of diagram, explain why mesh topology is considered to be the most secured topology?

BAYERO UNIVERSITY, KANO

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCES,

2018/2019 First Semester Examinations

CSC2253/CSC2251/SWE2303 - (Data Structures and Algorithms)

Instruction: Answer Any Four (4) Questions Time Allowed: 2 Hours

1) a. With the aid of diagrams, differentiate between singly, doubly and circular linked list. **6 marks**

b. If the characters 'S', 'E', 'D', 'C', 'B', 'F' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed? *(Show the state of the queue after each operation)* **6 marks**

c. Show that ({(A+B)-(CxD)}} is an invalid expression. **5.5 marks**

2) a. The following list of names is assigned (in order) to a linear array INFO: Hameed Isa, Daniel Baba, Haidar Salis, Gambo Shehu, Nattan John, Idris Barau, Becky Buba, Mudassir Tanimu, Ladi Hashim, Aisha Tille. That is INFO [1] = Hameed Isa, INFO[2]= Daniel Baba, …, INFO[10]= Aisha Tille. Assign values to an array LINK and a variable START so that INFO, LINK and START form an alphabetical listing of the names. **8 marks**

b. Using a linked list add the following polynomials $4x^5 + 5x^4 + 2x^3 + 3x^2 + 7x$ and $9x^6 + 6x^4 + 3x^2 + 3x$ **5.5 marks**

c. Give two applications of a linked list. **4 marks**

3) a. Consider the following stack of characters, where STACK is allocated N=10 memory cells:
STACK: A, C, D, F, K, X, --, --, --, --
("--" denotes an empty cell). What is the final STACK after performing the following operations?
POP (STACK, ITEM)
POP (STACK, ITEM)
PUSH (STACK, L)
PUSH (STACK, P)
PUSH(STACK, Y)
POP (STACK, ITEM)
PUSH (STACK, R)
PUSH (STACK, S)
POP (STACK, ITEM)
POP (STACK, ITEM)
(Show the state of the stack after each operation) **8 marks**

b. Give the postfix expression of the infix expression
A+(B*C-(D/E^F)*G) *H **8 marks**

c. Suppose you opened a notepad, a music player, an excel sheet, and also you are doing your data structure programming simultaneously. Your OS implements which data structure for it? **1.5 marks**

4) a. An array $A[-15:10, 15:40]$ requires one byte of storage and if beginning location is 1500 determine the location of $A[15][20]$ when the array is stored as row major. **5 marks**

b. The following postfix expression S and the initial values of the variables are. S = A B + C - D E F - + ^ Assume that A=10, B=7, C=5, D=2, E=4, F=2 What would be the final output of the stack? **6.5 marks**

c. what is the infix expression of the given Postfix expression: **AB/C*EFG*H/+D-+** **6 marks**

5) a. Construct the binary three with the following traversal sequences
Post-order: 7, 20, +, 6, 4, -, +, 15, 3, /, 2, -, *
in-order: 7, +, 20, +, 6, -, 4, *, 15, /, 3, -, 2 **10 marks**

b. Suppose you have a game with 5 coins in a row and each coin can be heads or tails. What number of vertices might you expect to find in the state graph? **1.5 marks**

c. Suppose that we are using the usual stack algorithm to convert the expression 4+3*(6*3-12) from infix to postfix notation. What is the maximum number of symbols that will appear on the stack AT ONE TIME during the conversion of this expression? **6 marks**

6) a. Evaluate the postfix expression: 6 3 2 4 + - *. Hence, give the equivalent infix expression. **2.5 marks**

b. i. What is the adjacency matrix of the graph below? **2 marks**

ii. Give the breath first search traversal (alphabetical) sequence of the graph. **9 marks**

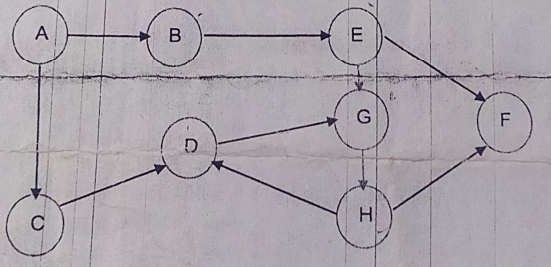


Figure 1

c. Explain any two algorithms for traversing a binary tree. **4 marks**

COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

2018/2019 First Semester Examinations

CSC2233 – (Web Programming 1)

Instructions: Answer any Four Questions **Time Allowed: 2 Hours**

1.

a. Write the HTML code that produce the following: (Assume that the pictures are stored in a folder "images" and are named image1.jpg, image2.jpg) 8marks

Students offering CSC2233

The following students have registered successfully for the course CSC2233 - Web Programming 1

SN	Registration No.	Name	Level	Picture
1	CST/17/COM/00023	Usman Ibrahim	300	
2	CST/16/COM/00001	Abubakar Adekunle	400	

b. As a web programmer, explain the sequence of activities that occur when a person wants to visit a website. 3marks

c. Write the skeletal structure of any html webpage 3marks

2.

a. What is the difference between each of the following pair?
   i. World Wide Web and Internet
   ii. Web Client and Server
   iii. Container element and Standalone element 6marks

b. Given the following URL, explain the components that make it up

https://www.buk.edu.ng/faculty/fcsit/staff.html

3 marks

c. Write the HTML markup that produces the following:

a. Which programming Language do you use?
   i. Java
   ii. Python

b. Do you relly enjoy programming?
   i. Yes
   ii. Not really

5marks

3.

a. Describe how a HTML file can be linked to an external CSS file 3marks

b.
   i. Mention the three ways in which HMTL elements can be styled 3marks
   ii. Explain briefly how each of the methods listed in b(i) above can be used to style HTML elements. 4marks

c. Describe using code how each of the following can be uploaded on a HTML page:
   i. A picture
   ii. Video file 4marks

4.

a. Write the HTML and CSS codes that produce the following: 7marks

Name:

Email:

Message:

b. Write the HTML markup that produce the following:
   i. 21^{st}
   ii. ©
   iii. H_2O 3marks

c. Write the HTML markup that produces the following: Note that HTML is a link.

CSC2233 is Fun!

Its all about HTML & CSS.

a. Differentiate between "class" and "id" in relation to CSS. 6marks

b. What is the purpose of the following tags?
   i. <pre>
   ii. <sub>
   iii. <sup> 3marks

c. A picture "background_pic.jpg" is saved in a folder "images" and is used as the background picture in the <footer> section of a website. 6marks

6. Draw the HTML markup that produces the following:

a.

Registered Students for CSC2233

SN	Registration No.	Level	Department
1	CST/20/COM/00001	100	Department of Computer Science
2	CST/19/SWE/00201	300	Department of Software Engineering
3	CST/17/IFT/02001	200	Department of Information Technology
4	CST/16/CBS/03100	400	Department of Information Technology

7marks

b. As a web programmer, explain the sequence of activities that occur when a person wants to visit a website. 3marks

c. Explain the roles of HTML and CSS in the design of website. 4marks

Faculty of Computer Sciences and Information Technology

Department of Computer Science

CSC2321 CA Test *Instruction: Answer All Questions* *Time: 60 Minutes* **TYPE A**

1. a. Check the validity of the following argument

"Either sales or expenses will go up. If sales go up, then the boss will be happy. If expenses go up, then the boss will be unhappy. Therefore, Sales and expenses will not both go up."

b. Verify the following logical equivalence using truth table

$$(p \wedge q \wedge \neg r) \vee (\neg p \wedge q \wedge \neg r) \equiv (\neg q \wedge \neg r) \vee (\neg p \vee \neg q \vee r)$$

2. a. Prove that $7^n - 1$ is divisible by 6 for all $n \in N$

b. Show that $2 + 4 + 6 + \cdots + 2n = n(n + 1)$ for all $n \in N$

3. Find the inverse of the matrix below

$$A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 5 & -1 \\ 3 & -2 & -1 \end{bmatrix}$$

Use the solution or otherwise to find the solution of the following system of linear equation

$$a + 2b + c = 3$$
$$2a + 5b - c = -4$$
$$3a - 2b - c = 5$$

BAYERO UNIVERSITY
FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE
2017/2018 Second Semester Examinations
CST1222/CSC2222 – (Ethics in Computing)

Time Allowed: 2 Hours

Instruction: Answer Any Four (4) Questions

1. a. What do you understand by Computer Ethics?
   b. List the six Walter Maner's levels of justification for the study of Computer Ethics.
   c. Give two ways of ensuring reasoning and impartiality in moral decision making.

2. a. Briefly explain two objectives of codes of ethics
   b. Briefly discuss the following ethical theories:
      i. Consequentialism
      ii. Deontology
      iii. Emotivism
   c. Differentiate between physical security and information security.

3. a. What is a profession?
   b. Differentiate between learned professions and common professions.
   c. What are the three basic requirements of a professional?

4. a. What is anonymity?
   b. List and explain the three types of anonymity.
   c. Is total anonymity possible?

5. a. What is encryption?
   b. With the aid of diagram, discuss the Hash functions
   c. Describe the three types of privacy

6. a. What are the two approaches adopted by the Computer Professionals (Registration Council of Nigeria) CPN for those who intend to live by the use of computational machinery and techniques?
   b. List three functions of CPN.
   c. What is a trade secret? What is the duration of a trade secret?

DEPARTMENT OF
2018/2019 First Semester Examination
CSC2321- Discrete Mathematics

Time Allowed: 3HRS

Instruction: answer any five (5) questions

1. a. Check the validity of the following arguments

   i. $p \rightarrow (q \vee r)$
   $\neg q \wedge \neg r$
   $p \vee r$
   $\therefore p \wedge q \wedge r$

   ii. $\neg r$
   $p \rightarrow q$
   $q \rightarrow r$
   $p \wedge r$
   $\therefore \neg p$

   b. Verify the following logical equivalence using truth table

   $$\neg p \wedge (q \vee \neg r) \equiv (\neg p \wedge q) \vee \neg(p \vee r)$$

2. a. Prove that $4^n + 6n - 1$ is divisible by 3 for all $n \in N$

   b. Show that $1 + 2^3 + 3^3 + \cdots + n^3 = (1 + 2 + 3 + \ldots + n)^2$ for all $n \in N$

3. a. Test the validity of the following argument:

   If I study, then I will not fail mathematics.

   If I do not play basketball, then I will study.

   But I failed mathematics.

   ∴ Therefore, I must have played basketball

   b. Check whether each of these is a tautology, a contradiction or neither

   i. $(\neg p \wedge r) \vee (r \vee \neg p)$
   ii. $(p \vee r) \wedge (\neg p \vee \neg r)$
   iii. $(r \vee p) \vee (\neg p \wedge \neg r)$

4. a. Consider the Z of integers and an integer $m > 1$. We say that x is congruent to y *modulo* m, written $x \equiv y \pmod m$ if $x - y$ is divisible by m. Show that this defines an equivalence relation on $\mathbf{Z}$

   b. Let A be the set {1,2,3,4,5}, Let the following relations be on the set A. List the pairs that are in each of the relations

   i. $R1 = \{(a,b) | a \leq b\}$
   ii. $R2 = \{(a,b) | a = b + 1\}$
   iii. $R3 = \{(a,b) | a + b \leq 6\}$

5. (a) Let $A=\begin{bmatrix}-2 & 4\\ 0 & 3\end{bmatrix}$ and $B=\begin{bmatrix}-6 & 2\\ 4 & 0\end{bmatrix}$. Find each value.

(i) $-4A+5B$ (ii) $7A^T-3B^T$ (iii) $2B-2A^T-4B^T$

(b) Let $A=\begin{bmatrix}-2 & 4\\ 1 & 3\end{bmatrix}$, $B=\begin{bmatrix}-2 & 1\\ 3 & 6\end{bmatrix}$ and $C=\begin{bmatrix}1 & 3 & 5 & 2\\ -2 & 4 & -1 & 0\end{bmatrix}$

(i) Find AB. (ii) Find BA. (iii) Find $AC-BC$ (iv) Find C^TA+C^TB

6. (a) Find the inverse, if it exists, for each matrix.

(i) $\begin{bmatrix}1 & 1\\ 2 & 3\end{bmatrix}$ (ii) $\begin{bmatrix}1 & 0 & 0\\ 0 & -1 & 0\\ 1 & 0 & 1\end{bmatrix}$ (iii) $\begin{bmatrix}1 & 3 & -2\\ 2 & 7 & -3\\ 3 & 8 & -5\end{bmatrix}$

(b) Solve the following systems of equation.

(i)
$$x+y+2z=-1$$
$$2x+2y+2z=2$$
$$\frac{3}{5}x+\frac{3}{5}y+\frac{3}{5}z=\frac{2}{5}$$

(ii)
$$x-2y+z-4w=1$$
$$x+3y+7z+2w=2$$
$$2x+y+8z-2w=3$$

7. Use Gauss-Jordan row reduction to solve the given systems of equation

(a)
$$x-y+z-u+v=1$$
$$y+z+u+v=2$$
$$z-u+v=1$$
$$u+v=1$$
$$v=1$$

(b)
$$x-y+z-u+v=0$$
$$y-z+u-v=-2$$
$$x-2v=-2$$
$$2x-y+z-u-3v=-2$$
$$4x-y+z-u-7v=-6$$

2018/2019 Second Semester

CSC2234/CST1226 – (Web Programming II)

Time Allowed: 2 Hours

Instruction: Answer any four (4) Questions

1.
a. Discuss the benefits of client side scripting when compared with server side scripting. **6 marks**
b. Compare and Contrast the rules of naming variables in JavaScript and those in PHP **4 marks**
c. $departments = array("COM"=>180, "IT"=>158, "CBS"=>160, "SWE"=>150)$ is an array that stores the departments and the respective number of students.
   i. What type of array is this PHP? **1 mark**
   ii. Use foreach loop to display each department and its associate number of students. 4 marks

2.
a. Explain with examples the different ways in which JavaScript code can be added to HTML files. 6 marks
b. Write a template/syntax of switch control structure in JavaScript and state the purpose of break and default statements. 4 marks
c. Write a JavaScript "for … loop" control that prints the squares of integers from 1 to 10 5 marks

3.
a. Define event in JavaScript. 3 marks
b. Explain the purpose of each of the following events:
   i. onclick
   ii. onfocus
   iii. onblur
   iv. onload
   v. onmouseover 5 marks
c. Write JavaScript code that displays a welcome message to the user when the user load the page, and prompts the user to enter their name, and display greeting to user [Hint: Use onload event for the welcome message.] 7 marks

4.
a. Write JavaScript code that takes an input from the user through the prompt and stores it in a variable score, print "failed" if the score is less than 40, and "passed" otherwise. 5 marks
b. Differentiate between while and the do…while loops in JavaScript. 4 marks
c. Create a basic HTML page that calls a JavaScript function display. The display function alerts the user with a message "I love JavaScript" when the user loads the page. [Hint: Use the unload event] 5 marks

5. a. Declare a function with name maximum that accepts two parameters (numbers) from the user and returns the maximum of the two when the function is called. 6 marks

b. Differentiate between indexed and associative arrays in PHP 5 marks

c. There are two basic ways to get output in PHP, briefly discuss them and differentiate the two. 4 marks

6. Identify and correct the errors if any in the JavaScript codes (a) and (b) below:

a.

i.
```
var function():
    var x = 25;
    var y = 5;
    var result = x * y;
    document.write(result);
```
3 marks

ii.
```
var x = "0";
switch (x) {
  case 0:
    text = "Off";
    break;
  case 1:
    text = "On";
    break;
    text = "No value found";
}
```
2 marks

b.
```
var age = parseInt(window.prompt("Enter your age:"));
if (age < 14){
    window.alert("Sorry, you are not eligible for this program");
else {
    window.alert("Congratulations, you are eligible for this program");
    }
elseif (age > 40){
    window.alert("Sorry, you may apply for the advanced program");
}
```
3 marks

c. 3 marks

i. What is a user-defined function?

ii. What is the difference between the codes below?

```
myFunction(4, 3);
```
and
```
function myFunction(a, b){
  return a * b;
}
```
3 marks

BAYERO UNIVERSITY, KANO

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCES

2018/2019 First Semester Examinations

CSC2211/SWE2205 - (Computer System Theory/Logic and its Application in Computer Science)

Instruction: Answer Any Four (4) Questions **Time Allowed: 2 Hours**

1) a. Convert each of the following expressions to Sum of Product (SOP) forms

i. $B + C[BD + (C + \overline{D})E]$ ii. $BC + DE(B\overline{C} + DE)$

b. Convert each SOP expression in (a) above to Standard SOP form

c. Develop a truth table for the standard POS expression

$(A + \overline{B} + C + \overline{D})(\overline{A} + B + \overline{C} + D)(A + B + \overline{C} + \overline{D})(\overline{A} + \overline{B} + C + D)$

2) a. Subtract $A6_{16}$ from $F1_{16}$

b. Use a K-Map to reduce each expression to a minimum SOP form

i. $\overline{A}B(\overline{C}\overline{D} + \overline{C}D) + AB(\overline{C}D + \overline{C}D) + A\overline{B}\overline{C}D$ ii. $\overline{A}\overline{B}C + \overline{A}\,\overline{B}C + A\overline{B}C$

c. Convert the binary number **10110101** to gray code.

3) a. Simplify the following Expressions

i. $\overline{(\overline{A} + C)(A\overline{B} + C)}$ ii. $\overline{(\overline{A} + B + C + D)\,(A\overline{B}CD)}$

b. From the simplified expression in (a) above draw the logic circuit.

c. Using Boolean Algebra, Simplify the following expressions

i. $(B + \overline{B})(BC + BC\overline{D})$ ii. $CE + C(E + F) + \overline{E}(E + G)$

4) a. Convert each of the following POS expression to minimum SOP expression using a K-Map

i. $(\overline{A} + \overline{B})(A + \overline{C})(\overline{A} + \overline{B} + C)$ ii. $(\overline{A} + B)(\overline{A} + \overline{B} + \overline{C})(B + \overline{C} + D)(A + \overline{B} + C + \overline{D})$

b. Express the decimal number **340**

i. In Binary ii. In Octal

c. Find the 2's Complement of **11001011**

5) Bayero university pure water factory in order to meet with the demand of pure water in kano upgraded its pure water factory by adding two (2) tanks to its existing 2 tanks. two of the tanks contains water and the other two contains chemicals used for the purification of the water, Generate the output using AND-OR circuit and develop the truth table

a. Generate the output using AND-OR INVERT circuit and develop the truth table

b. Draw the logic gates for each of the above

c. Using logic diagrams explain how NAND and NOR gates are universal gates

) Ismail's chemical laboratory stores chemical used for the production of drugs in 3 different cylinder, a level sensor in each tank produces a HIGH voltage when the level of chemical in the tank drops below a specified point.

a. Design a circuit that monitors the chemical level in each tank and indicates when the level in any two of the tanks drops below the specified point and write the Boolean SOP expression

b. With the aid of a logic diagram differentiate between a full adder and a half adder

c. Define flip flops and explain any two of its types

DEPARTMENT OF COMPUTER SCIENCE,
2018/2019 First Semester Examinations
SWE 2301- (INTRODUCTION TO SOFTWARE ENGINEERING)

Instruction: Attempt the question in Section A and any four (4) questions from Section B giving a total of five (5) questions in all.

Time Allowed: 3 Hours

Section A: Answer all

1. You are asked to develop an Online Shopping System for MIMSAH organization. The system shall enable a user to browse a catalog, select items, place order and make payment. The user can also contact the organization through a phone call to confirm the status of the order. The Admins of the organization are responsible for uploading new items and maintaining the system.
   a. Draw a context diagram based on the above description. **(5 marks)**
   b. Draw a use case diagram based on the above description. **(5 marks)**
   c. Draw an activity diagram for the system. The procedure for using is given below: **(4 marks)**

   Once a user enters the MIMSAH site, the system will display the products catalog. The user searches through it and only select an item if it is desired. The user then proceed to add the selected item to cart. If the user finishes adding all selected items to cart, he/she can then proceed to place order and make payment. If the payment is successful, the system generates an invoice and display it for user.

Section B: Answer any four (4) questions

2. a. Define Software Engineering. Mention (2) aspects of its importance **(3 marks)**
   b. Write short notes on the following terms: **(8 marks)**
   i. Software Engineer ii. Generic products ii. Customized products iv. System Engineering
   c. Mention the three (3) main issues that affect all type of software systems. **(3 marks)**
3. a. Mention four (4) activities that are common to all software processes **(3 marks)**
   b. With the help of diagrams, give one example each of a plan and an agile software development life cycle. **(8 marks)**
   c. Mention three (3) differences between plan-driven and agile driven development **(3 marks)**
4. a. Define the term Software Prototyping. Mention two (2) aspects of its benefits **(3 marks)**
   b. Explain the following terms: **(8 marks)**
   i. Feasibility study ii. Requirement Elicitation iii. Requirement Specification
   c. State the three (3) ways in which the requirements of a system can be documented **(3 marks)**
5. a. Define the term Software Architecture. Mention two (2) advantages of Architectural Design **(3 marks)**
   b. Briefly explain the following terms: **(5 marks)**
   i. Modularity ii. Architectural Styles
   c. List four **(4)** types of System Model and give examples of diagram used in each model. **(6 marks)**
6. a. Mention any three (3) factors to consider when selecting a Programming Language and briefly explain one of them **(3 marks)**
   b. Write short notes on the following terms: **(8 marks)**
   i. Program testing ii. Unit testing iii. Performance testing iv. Requirement based testing
   c. What is User Testing? Mention the three (3) types of User testing **(3 marks)**
7. a. Mention four (4) problems that are encountered during Software Maintenance **(3 marks)**
   b. Explain the following terms: **(8 marks)**
   i. Corrective Maintenance ii. Project Planning iii. Risk Management
   c. State three (3) critical factors that project managers need to uphold when managing people **(3 marks)**

DEPARTMENT OF COMPUTER SCIENCES, INFORMATION TECHNOLOGY
2018/2019 First Semester Examinations
CSC2253/CSC2251/SWE2303 - (Data Structures and Algorithms)

Instruction: Answer Any Four (4) Questions

Time Allowed: 2 Hours

1) a. With the aid of diagrams, differentiate between singly, doubly and circular linked list. **6 marks**

   b. If the characters 'S', 'E', 'D', 'C', 'B', 'F' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed? *(Show the state of the queue after each operation)* **marks 6**

   c. Show that ({(A+B)-(CxD)}} is an invalid expression. **5.5 marks**

2) a. The following list of names is assigned (in order) to a linear array INFO: Hameed Isa, Daniel Baba, Haidar Salis, Gambo Shehu, Nattan John, Idris Barau, Becky Buba, Mudassir Tanimu, Ladi Hashim, Aisha Tille. That is INFO [1] = Hameed Isa, INFO[2]= Daniel Baba, …, INFO[10]= Aisha Tille. Assign values to an array LINK and a variable START so that INFO, LINK and START form an alphabetical listing of the names. **8 marks**

   b. Using a linked list add the following polynomials $4x^5 + 5x^4 + 2x^3 + 3x^2 + 7x$ and $9x^6 + 6x^4 + 3x^2 + 3x$ **5.5 marks**

   c. Give two applications of a linked list. **4 marks**

3) a. Consider the following stack of characters, where STACK is allocated N=10 memory cells: STACK: A. C, D, F, K, X, --, --, --, -- ("--" denotes an empty cell). What is the final STACK after performing the following operations?
   POP (STACK, ITEM)
   POP (STACK, ITEM)
   PUSH (STACK, L)
   PUSH (STACK, P)
   PUSH(STACK, Y)
   POP (STACK, ITEM)
   PUSH (STACK, R)
   PUSH (STACK, S)
   POP (STACK, ITEM)
   POP (STACK, ITEM)
   (Show the state of the stack after each operation) **8 marks**

   b. Give the postfix expression of the infix expression
   A+(B*C-(D/E^F)*G) *H **8 marks**

   c. Suppose you opened a notepad, a music player, an excel sheet, and also you are doing your data structure programming simultaneously. Your OS implements which data structure for it? **1.5 marks**

4) a. An array $A[-15:10, 15:40]$ requires one byte of storage and if beginning location is 1500 determine the location of $A[15][20]$ when the array is stored as row major. **5 marks**

b. The following postfix expression S and the initial values of the variables are. S = A B + C - D E F - + ^ Assume that A=10, B=7, C=5, D=2, E=4, F=2 What would be the final output of the stack?

6.5 marks

c. what is the infix expression of the given Postfix expression: **AB/C*EFG*H/+D-+**

6 marks

5) a. Construct the binary three with the following traversal sequences
Post-order: 7, 20, +, 6, 4, -, +, 15, 3, /, 2, -, *
In-order: 7, +, 20, -, 6, -, 4, *, 15, /, 3, -, 2

10 marks

b. Suppose you have a game with 5 coins in a row and each coin can be heads or tails. What number of vertices might you expect to find in the state graph? **1.5 marks**

c. Suppose that we are using the usual stack algorithm to convert the expression 4+3*(6*3-12) from infix to postfix notation. What is the maximum number of symbols that will appear on the stack AT ONE TIME during the conversion of this expression?

6 marks

6) a. Evaluate the postfix expression: 6 3 2 4 + - *. Hence, give the equivalent infix expression. **2.5 marks**

b. i. What is the adjacency matrix of the graph below? **2 marks**

ii. Give the breath first search traversal (alphabetical) sequence of the graph. **9 marks**

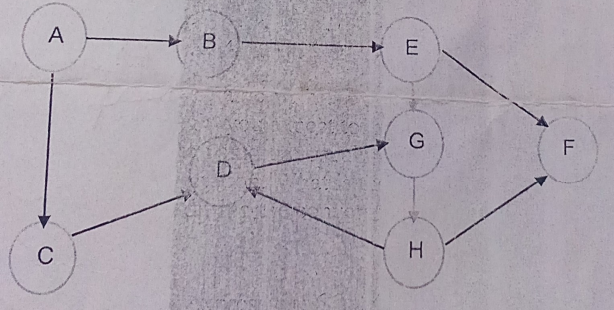


Figure 1

c. Explain any two algorithms for traversing a binary tree. **4 marks**

Instruction: Answer Any Four (4) Questions Time Allowed: 2 Hours

1) a. With the aid of diagrams, differentiate between singly, doubly and circular linked list. **6 marks**

b. If the characters 'S', 'E', 'D', 'C', 'B', 'F' are placed in a queue (in that order), and then removed one at a time, in what order will they be removed? *(Show the state of the queue after each operation)* **6 marks**

c. Show that ({(A+B)-(CxD)}} is an invalid expression. **5.5 marks**

2) a. The following list of names is assigned (in order) to a linear array INFO: Hameed Isa, Daniel Baba, Haidar Salis, Gambo Shehu, Nattan John, Idris Barau, Becky Buba, Mudassir Tanimu, Ladi Hashim, Aisha Tille. That is INFO [1] = Hameed Isa, INFO[2]= Daniel Baba, …, INFO[10]= Aisha Tille. Assign values to an array LINK and a variable START so that INFO, LINK and START form an alphabetical listing of the names. **8 marks**

b. Using a linked list add the following polynomials $4x^5 + 5x^4 + 2x^3 + 3x^2 + 7x$ and $9x^6 + 6x^4 + 3x^2 + 3x$ **5.5 marks**

c. Give two applications of a linked list. **4 marks**

3) a. Consider the following stack of characters, where STACK is allocated N=10 memory cells:
STACK: A, C, D, F, K, X, --, --, --, --
("--" denotes an empty cell). What is the final STACK after performing the following operations?
POP (STACK, ITEM)
POP (STACK, ITEM)
PUSH (STACK, L)
PUSH (STACK, P)
PUSH(STACK, Y)
POP (STACK, ITEM)
PUSH (STACK, R)
PUSH (STACK, S)
POP (STACK, ITEM)
POP (STACK, ITEM)
(Show the state of the stack after each operation) **8 marks**

b. Give the postfix expression of the infix expression
A+(B*C-(D/E^F)*G) *H **8 marks**

c. Suppose you opened a notepad, a music player, an excel sheet, and also you are doing your data structure programming simultaneously. Your OS implements which data structure for it? **1.5 marks**

4) a. An array $A[-15:10, 15:40]$ requires one byte of storage and if beginning location is 1500 determine the location of $A[15][20]$ when the array is stored as row major. **5 marks**

b. The following postfix expression S and the initial values of the variables are. S = A B + C - D E F - + ^ Assume that A=10, B=7, C=5, D=2, E=4, F=2 What would be the final output of the stack? **6.5 marks**

c. what is the infix expression of the given Postfix expression: **AB/C*EFG*H/+D-+** **6 marks**

5) a. Construct the binary three with the following traversal sequences.
Post-order: 7, 20, +, 6, 4, -, +, 15, 3, /, 2, -, *
In-order: 7, +, 20, +, 6, -, 4, *, 15, /, 3, -, 2 **10 marks**

b. Suppose you have a game with 5 coins in a row and each coin can be heads or tails. What number of vertices might you expect to find in the state graph? **1.5 marks**

c. Suppose that we are using the usual stack algorithm to convert the expression 4+3*(6*3-12) from infix to postfix notation. What is the maximum number of symbols that will appear on the stack AT ONE TIME during the conversion of this expression? **6 marks**

6) a. Evaluate the postfix expression: 6 3 2 4 + - *. Hence, give the equivalent infix expression. **2.5 marks**

b. i. What is the adjacency matrix of the graph below? **2 marks**

ii. Give the breath first search traversal (alphabetical) sequence of the graph. **9 marks**

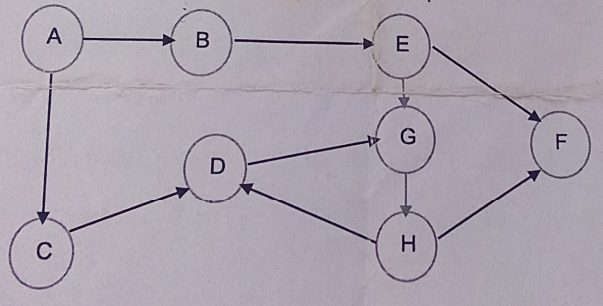


Figure 1

c. Explain any two algorithms for traversing a binary tree. **4 marks**

2018/2019 Academic Session - First Semester Examinations

ITC2301 - *Introduction to Web Computing*

Instruction: *Answer Any Four (4) Questions* Time Allowed: *2 Hours*

1. a. Distinguish between the Internet and the Web. [2.5 Marks]
   b. List six (6) fundamental technologies of the web and briefly explain any two (2). [5 Marks]
   c. Write the skeletal structure of any html webpage. [5 Marks]

2. a. With examples, distinguish the following: [4 Marks]
      i. HTML Tag
      ii. HTML Element
      iii. HTML Attribute
   b. List five (5) HTML special characters you know. [2.5 Marks]
   c. Write code for the following: [6 Marks]

Positive Mind

Life is full of opportunities. Those who are ready seize them!

Weak mind complains...

3. a. Briefly contrast the following terms: [4 Marks]
      i. HTML
      ii. XHTML
      iii. HTML5
   b. With example, briefly explain how you insert image in a web page. [2.5 Marks]
   c. Write the html code for the following: [6 Marks]

Weekly Schedule

- Monday
  1. Plan schedule for week
  2. Complete Project X
     - Preliminary Interview
     - Wild Hypothesis
  3. Abuse underlings

4. a. Write the code for the following: [6.5 Marks]

CA Scores

Name	Score
Ahmad Musa	25
Ibrahim Isah	28

b. Draw the output of the following html code: [6 Marks]

```
<body>
  <table border = "1">
    <tr>
      <th>Column 1</th>
      <th>Column 2</th>
      <th>Column 3</th>
    </tr>
    <tr>
      <td rowspan = "2">Row 1 Cell 1</td>
      <td>Row 1 Cell 2</td>
      <td>Row 1 Cell 3</td>
    </tr>
    <tr>
      <td>Row 2 Cell 2</td>
      <td>Row 2 Cell 3</td>
    </tr>
    <tr>
      <td colspan = "3">Row 3 Cell 1</td>
    </tr>
  </table>
</body>
```

5. a. State the design considerations for good html forms. [3 Marks]
   b. Write an html code for the following user authentication page: [3 Marks]

Username: [ ]

Password: [ ]

   c. Name and briefly explain, with example, the html element used to specify list of pre-defined options for an <input> element. [6.5 Marks]

6. a. What is style inheritance? [2 Marks]
   b. State four (4) advantages of external style sheet. [4 Marks]
   c. Using the *resume.html* and collection of styles below, demonstrate how the *styles* are used as:
      i. Internal style sheet
      ii. External style sheet [6 Marks]

resume.html

```
<!DOCTYPE html>
<html>
  <head>
      <title>Hire Me!</title>
  </head>
  <body>
      <h1>Hire Me!</h1>
      <p>I am Ahmad. Hire me for your company, because I know
      HTML!</p>
  </body>
</html>
```

Styles

```
h1 {
  border-style: double;
  color: fuchsia;
  text-align: center;
}
body {
  font-family: Verdana, Arial, sans-serif;
  font-size: small;
}
p {
  margin-top: 2px;
}
```


BAYERO UNIVERSITY, KANO

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

Course: ITC2301-Introduction To Web Computing (First Semester2018/2019 session) **Date:** 28/05/2019

Instruction: Answer any two Questions **Duration:** 30 minutes

1. a. Distinguish between the Internet and the Web.
   b. Write the skeletal structure of any html webpage.
2. a. With examples differentiate between container and standalone elements.
   b. Write the html code for the following:

Weekly Schedule

- Monday
  1. Plan schedule for week
  2. Complete Project X
     - Preliminary Interview
     - Wild Hypothesis
  3. Abuse underlings

3. a. Draw the output of the following html code:

```
<body>
  <table border = "1">
    <tr>
      <th>Column 1</th>
      <th>Column 2</th>
      <th>Column 3</th>
    </tr>
    <tr>
      <td rowspan = "2">Row 1 Cell 1</td>
      <td>Row 1 Cell 2</td>
      <td>Row 1 Cell 3</td>
    </tr>
    <tr>
      <td>Row 2 Cell 2</td>
      <td>Row 2 Cell 3</td>
    </tr>
    <tr>
      <td colspan = "3">Row 3 Cell 1</td>
    </tr>
  </table>
</body>
```

b. Write an html code for the following user authentication page:

Username: [ ]

Password: [ ]