

**Department of Higher Education  
University of Computer Studies  
Fourth Year (B.C.Sc. / B.C.Tech.)  
Final Examination  
English  
September 2017  
Zone III**

**Answer All Questions.**

**Time Allowed: 3 Hours**

**I. Read the passage and answer the following Questions 1 - 10.**

**(20 marks)**

**A.** The software tools of research are typically more abundant than hardware tools in the social sciences. Software is usually thought of as meaning computer programs that tell the hardware what to do, but any tool not related to a physical device can be considered software. Include in this category are published tests and questionnaires.

**B.** Often researchers want to gather information related to a general area such as personality or intelligence. For these instances, the use of a standardized test may be the best choice. With already published tests you can be sure of both validity and reliability and can save a lot of time that might otherwise be spent on test construction. Standardized tests can be classified into five main categories: achievement, aptitude, interest, personality, and intelligence.

**C.** Achievement tests are designed specifically to measure an individual's previously learned knowledge or ability. They are available for many- topic areas related to psychology, education, business, and other fields. Achievement tests require that prior learning take place and that this learning be demonstrated in order to pass.

**D.** Aptitude tests attempt to predict an individual's performance in some activity at some point in the future. They do not require any specific prior learning although basic knowledge related to reading and writing is usually required and some preparation, such as studying up on math formulas or sentence structure, can be helpful. A well-known example of this type is the Scholastic Achievement Test (SAT), designed to predict future college performance.

**E.** Interest inventories also require only general knowledge but no preparation is needed. These tests look at an individual's subjective interests in order to make predictions about some future behavior or activity. Perhaps the most used interest inventory is the Strong Interest Inventory, which compares interests related to specific careers in order to help guide an individual's career path. Endorsed interests are compared with the interests of successful individuals in various fields and predictions are made regarding the test-taker's fit with the various career fields.

**F.** Typically designed to assess and diagnose personality and mental health related disorders, personality tests are used extensively by psychologists in clinical, educational, and business related settings. By far the most widely used test of this type is the Minnesota Multiphasic Personality Inventory, Second Edition (MMPI-2), which compares an individual's responses on a series of true-false items to those suffering from various mental disorders such as depression, schizophrenia, and anxiety. The theory

behind the test argues that if you endorse items similar to the items endorsed by those with depression, for example, then the chances that you are also depressed increases.

G. Intelligence tests could be classified as aptitude tests since they are sometimes used to predict future performance. They could also be classified as personality tests since they can be used to diagnose disorders such as learning disabilities and mental retardation. However, because of their limited scope, we will place them in their own category. The purpose of an intelligence test is to attain a summary score or intelligence quotient (IQ) of an individual's intellectual ability. Scores are compared to each other and can be broken down into different subcategories depending on the intelligence test used. The most commonly used tests of this type are the Wechsler Adult Intelligence Scale for Children (WISC), and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI).

H. Self-response questionnaires are a great way to gather large amounts of information in a relatively short amount of time. A questionnaire, similar to a survey you might see on a web page, allows subjects to respond to questions, rate responses, or offer opinions. Their responses can then be used to place them in specific categories or groups or can be compared to other subjects for data analysis. A concern with self-report, however, is the accuracy of the responses. Unlike direct observation, there is no way of knowing if the subject has told the truth or whether or not the question was understood as intended. There are several different methods for gathering information on a questionnaire or survey, including a Likert scale is a popular method used in surveys because it allows the researcher to quantify opinion based items. Questions are typically grouped together and rated or responded to base on a five-point scale. This scale typically ranges in order from one extreme to the other, such as (1) very interested; (2) somewhat interested; (3) unsure; (4) not very interested; and (5) not interested at all. Items that might be rated with this scale representing the subject's level of interest could include a list of careers or academic majors, for example.

### Questions 1-6

Choose the correct heading for paragraphs A-F from the list of headings below.

#### List of Headings

- i. Testing acquired knowledge
- ii. The way future performance is forecast through testing
- iii. Software tools in research explained
- iv. The method most widely used by psychologists in various situation
- v. the use of a five-point scale in testing
- vi. Subjective interests employed to predict future behavior
- vii. The different classes of standardized tests
- viii. Information gathered by self-reporting

- 1. Paragraph A
- 2. Paragraph B
- 3. Paragraph C
- 4. Paragraph D
- 5. Paragraph E
- 6. Paragraph F

**Questions 7-9**

**Do the following statements agree with the claims of the writer in the passage?**

- Yes** if the statement reflects the claims of the writer  
**NO** if the statement contradicts the claims of the writer  
**NOT GIVEN** if it is impossible to say what the writer thinks of this

7. The Wechsler Scales are the only type of intelligence test now used.  
8. Where large quantities of data need to be collected fairly quickly self-response questionnaires work well.  
9. The Likert Scale ensures greater accuracy than other techniques.

**Question 10**

**Choose the correct letter A, B, C or D.**

10. Which of the following is the most suitable heading for the Passage?  
A Different types of intelligence test  
B How personality can be tested  
C The importance of aptitude tests  
D The various software tools of research

**II. Fill the gaps in the following paragraph using the words in the box. (20 marks)**

textbooks	accessible	culture	highly	to	pattern	to
teachers	marks	principle	of	take	and	education
concept	of	small	out	keen	copy	

Traditional ways of teaching form the basis .....1..... the lesson and the remarkably quite classes .....2..... their won notes of the points made .....3..... the examples demonstrated. Everyone has their own .....4..... of the text book supplied by the central .....5..... authority, Monbusho, as part of the concept .....6..... free compulsory education up to the age .....7..... 15. These textbooks are, on the whole, .....8....., presumably inexpensive to produce but well set .....9..... and logically developed. (One teacher was particularly .....10..... to introduce colour and pictures into maths .....11..... he felt this would make them more .....12..... to pupils brought up in a cartoon .....13.....). Besides, approving textbooks, Monbusho also decides the .....14..... centralised national curriculum and how it is .....15..... be delivered. Lessons all follow the same .....16..... . At the beginning, the pupils put solutions .....17..... the homework on the board, then the .....18..... comment, correct or elaborate as necessary. Pupils .....19..... their homework: this is an important .....20..... in Japanese schooling as it enables pupils to see where and why they made a mistake, so that these can be avoided in future.

**III. (A) Complete the conversation. Put in the pronouns. (10 marks)**

- Nick: Did ...<sup>(1)</sup>.....say that you and Harriet wanted some coloured lights for your party?  
Mike: Yes, but ...<sup>(2)</sup>.....is OK, Melanie's neighbor Jake has got some, and .....<sup>(3)</sup>.....is going to lend them to ...<sup>(4)</sup>.....  
Nick: Great. Is Rita coming to the party?

Mike: We've invited ...<sup>(5)</sup>.....of course, but she is not sure if ...<sup>(6)</sup>.... can come or not. Her parents are flying somewhere on Saturday evening, and she might be taking .....<sup>(7)</sup>... to be airport.

Nick: And what about Laura's friend Emily?

Mike: I expect .....<sup>(8)</sup>... will be there. And her brother ...<sup>(9)</sup>.... both came to our last party.

Nick: Do you mean Jason? I don't like him very much.

Mike: Oh, he is OK. But ...<sup>(10)</sup>.... don't have him.

**III. (B) Choose the correct form. Just write down the number and the answer. (10 marks)**

1. Your exam results were very (good / well).
2. You did very (good / well) in your exams.
3. I didn't sleep very (good /well) last night.
4. How are you? Are you (good / well)?
5. George speaks German very (good / well).
6. George's German is very (good / well).
7. I'm tired because I've been working (hard / hardly).
8. I tried (hard / hardly) to remember her name but I couldn't.
9. This coat is practically unused. I've (hard / hardly) worn it.
10. She's a good tennis player. She hits the ball (hard / hardly).

**IV. (A) Answer the following questions. (10 marks)**

1. What types of leisure activities are popular in your country?
2. Why it is important for people to have time for leisure activities?
3. Why are some activities more popular than others?
4. Are there types of leisure activities that are popular today the same as those that were popular when your parents were young?
5. What types of leisure activities may become more popular in the future?

**IV. (B) You have been assigned the duty of running the annual Christmas party in an organization you are familiar with. Write an announcement memo to all staff, setting out details of time, venue, entertainment costs and any other details you feel are relevant. (10 marks)**

**V. Write the following topic: (20 marks)**

Some people think that the increasing use of computers and mobile phones for communication has had a negative effect on young people's reading and writing skills. To what extent do you agree or disagree with this opinion.

Give your own opinion and relevant examples from experience.

\*\*\*\*\***END**\*\*\*\*\*

**Department of Higher Education**  
**University of Computer Studies**  
**Fourth Year (B.C.Sc.)**  
**Final Examination**  
**E-business & E-commerce Management (CS-401)**  
**September, 2017**  
**Zone III**

**Answer All Questions.**

**Time Allowed: 3 Hours**

1. Choose the correct answer for the following. For each choice, write (A),(B),(C) or (D) only. (15 marks)
- (i) When you look at e-commerce and e-business, which is the most realistic relationship between these two concepts?
- A. E-commerce has some overlap with e-business
  - B. E-commerce is a subset of e-business
  - C. E-commerce is broadly equivalent to e-business
  - D. E-business is a subset of e-commerce
  - E. None of the above
- (ii) A key marketing technique involves paid placements or sponsored links using PPC. What does PPC stand for?
- A. Pay per click
  - B. Pay per consumer
  - C. Personal protocol choice
  - D. Public promotion click
- (iii) Which one of the following terms refers to 'cutting out the middleman'?
- A. Countermediation
  - B. Reintermediation
  - C. Disintermediation
  - D. None of the above
- (iv) The architecture of hardware, software, content and data is known as:
- A. E-business infrastructure
  - B. E-business web structure
  - C. E-commerce infrastructure
  - D. None of the above
- (v) A private network within a company can be used to provide shared content for staff is known as:
- A. Internet
  - B. Extranet
  - C. Open source
  - D. Intranet
- (vi) A revenue model which involves payment for third party promotions on a media site is a:
- A. Subscription model
  - B. Affiliate model
  - C. Retail model
  - D. Advertising model

- (vii) What could be an implication for an organisation if an e-business strategy is not clearly defined?
- A. Clear direction of e-business strategy
  - B. Greater opportunities from evaluation of opportunities
  - C. Effective integration of e-business at a technical level
  - D. None of the above are applicable
- (viii) Evaluating developments in hardware and software in the macro-environment is related to this SLEPT factor:
- A. Social
  - B. Political; economic
  - C. Technological
  - D. Legal and ethical
- (ix) Transactions between an organisation and its suppliers and intermediaries, equivalent to buy-side e-commerce is known as:
- A. Supply streaming
  - B. The downstream supply chain
  - C. The upstream supply chain
  - D. None of the above
- (x) A breakdown of customers according to different characteristics. This approach is known as:
- A. Psychographics segmentation
  - B. Webographics
  - C. Online buyer behaviors
  - D. None of the above
- (xi) Poor strategic decisions have been the downfall of many well-known Internet companies. One reason is:
- A. Lack of creativity
  - B. Learning and growth
  - C. Manage risks
  - D. None of the above
- (xii) There are options for restructuring the supply chain. A characteristic of vertical integration is:
- A. Total reliance on linked third parties
  - B. Majority of manufacture is in-house
  - C. Close relationships with suppliers
  - D. All of the above
- (xiii) To be effective, environmental scanning needs to be carried out:
- A. Only when work demands allow otherwise the flow of business could be disrupted
  - B. When competitors have reacted
  - C. On a continuous basis
  - D. All of the above
- (xiv) Within a strategy process model, strategic option, evaluation, plus selection forms part of:
- A. Strategic implementation
  - B. Strategic definition
  - C. Strategic analysis
  - D. Strategic objectives

- (xv) Personal data is a key term related to privacy. Which of the following is the best definition of this term?
- A. Any information about an individual stored by companies concerning their customers or employees
  - B. Each company must have a defined person responsible for data protection
  - C. The process whereby companies register with the data protection register to inform about their data holdings
  - D. The legal term to refer to the individual whose data is held

2. Define **Any Five** of the following: (15 marks)

- (a) Supply chain management
- (b) Strategy implementation
- (c) Data controller
- (d) Vertical integration
- (e) Buy-side e-commerce
- (f) Disintermediation
- (g) Dedicated server

3. Write short notes on **Any Four** of the following: (20 marks)

- (a) The different between *Push* supply chain model and *Pull* supply chain model.
- (b) Describe the different levels of strategy for larger or globalization organizations.
- (c) Describe the *main barriers* to adoption of e-commerce by consumers.
- (d) What are the main types of commercial transactions that can occur through the internet or in traditional commerce?
- (e) Describe the *three* characteristics of service-oriented architecture (SOA).
- (f) What are the main information types used by the internet marketer which are governed by ethics and legislation?

4(a) Explain the implications, if e-business strategy is not clearly defined. (5 marks)

(b) Why have many other Internet companies failed or merged and many existing companies invested in e-commerce without achieving a satisfactory return on investment? Explain briefly. (5 marks)

5. Explain the different types of sell-side e-commerce. (10 marks)

6. Answer **Any Three** of the following: (30 marks)

- (a) Define privacy and ethical standards. Why personal data are valuable for e-business?
- (b) Define business model. Describe the *eight key* elements of the business model for e-commerce.
- (c) Define Enterprise resource planning (ERP). Describe the benefits and disadvantages of web services or software as a service (SaaS).
- (d) Define downstream supply chain. In managing global distribution, describe *seven actions* that manufactures should follow as they enter new overseas markets enable by the internet.

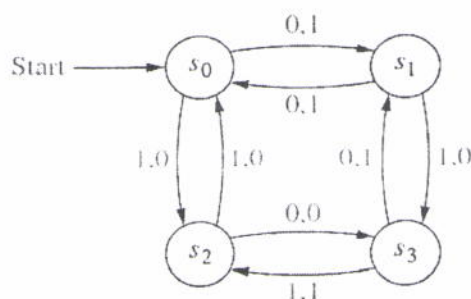
**Department of Higher Education**  
**University of Computer Studies**  
**Fourth Year (B.C.Sc. / B.C.Tech.)**  
**Final Examination**  
**Mathematics of Computing IV (CST-402)**  
**September 2017**  
**Zone III**

**Answer All Questions.**  
**Hours**

**Time Allowed: 3**

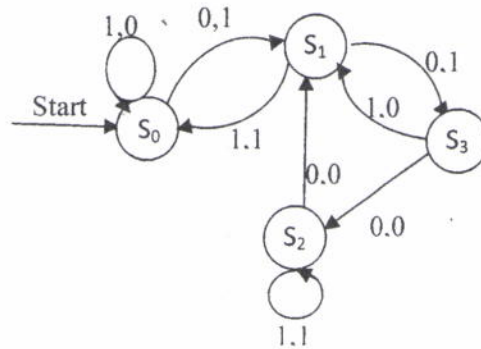
1. (a) A vending machine dispensing books of stamps accepts only one-dollar coins, \$1 bills, and \$5 bills.
- (i) Find a recurrence relation for the number of ways to deposit  $n$  dollars in the vending machine, where the order in which the coins and bills are deposited matters.
  - (ii) What are the initial conditions?
  - (iii) How many ways are there to deposit \$10 for a book of stamps? (10 marks)
- (b) Determine whether the recurrence relation  $a_n = 6a_{n-1} - 12a_{n-2} + 8a_{n-3}$  is linear, homogeneous or not? What is its degree? Solve this recurrence relation with initial conditions  $a_0 = -5$ ,  $a_1 = 4$  and  $a_2 = 88$ . (10 marks)
- 2.(a) Find all solutions of the recurrence relation  $a_n = 4a_{n-1} - 4a_{n-2} + (n + 1)2^n$ . (10 marks)
- (b)(i) Find a closed form for the generating function for the sequence 1, 0, -1, 0, 1, 0, -1, 0, 1, 0, -1, .....
- (ii) Use generating functions to determine the number of different ways in which eleven identical blocks can be given to four children, if each child gets at least two blocks. (6 marks)
3. (a) Use generating functions to solve the recurrence relation  $a_k = a_{k-1} + 2a_{k-2} + 2^k$  with initial condition  $a_0 = 4$  and  $a_1 = 12$ . (10 marks)
- (b) Let  $G$  be the grammar with vocabulary  $V = \{S, A, B, a, b\}$ , set of terminals  $T = \{a, b\}$  and starting symbol  $S$ . Find the language generated by the grammar  $(V, T, S, P)$  when the set  $P$  of productions consist of
- (i)  $S \rightarrow AB, A \rightarrow ab, B \rightarrow bb$
  - (ii)  $S \rightarrow AB, S \rightarrow aA, A \rightarrow a, B \rightarrow ba$
  - (iii)  $S \rightarrow AB, S \rightarrow AA, A \rightarrow aB, A \rightarrow ab, B \rightarrow b$
  - (iv)  $S \rightarrow AA, S \rightarrow B, A \rightarrow aaA, A \rightarrow aa, B \rightarrow bB, B \rightarrow b$ . (10 marks)

4. (a)(i) Give a state table for the finite-state machine with the following state diagram.(5 marks)





- (ii) Find the output for each of these input strings when given as input to the following finite-state machine. (a) 0111 (b) 11011011 (c) 01010101010. (5 marks)



- (b) Construct phrase-structure grammars to generate each of these sets

- (i)  $\{01^{2n} \mid n \geq 0\}$  (ii)  $\{0^n 1^{2n} \mid n \geq 0\}$   
 (iii)  $\{0^n 1^m 0^n \mid m \geq 0 \text{ and } n \geq 0\}$  (iv)  $\{(11)^n \mid n \geq 0\}$  (v)  $\{10^n \mid n \geq 0\}$

(10 marks)

- 5.(a) Construct deterministic finite-state automata that recognize (i) the set of bit strings that do not contain two consecutive 0s (ii) the set of all bit strings that contain string 101.

(10 marks)

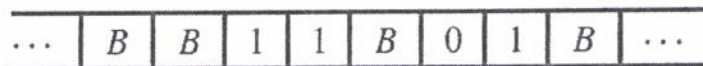
- (b)(i) Determine whether 0101 belongs to each of these regular sets.

- a)  $01^*0^*$  b)  $0(10)^*1^*$  c)  $0^*(10)^*11$  d)  $0(11)^*(01)^*$  e)  $0^*(10 \cup 11)^*$

(5 marks)

- (ii) Let  $T$  be the Turing machine defined by the five tuples:  $(s_0, 0, s_1, 1, R)$ ,  $(s_0, 1, s_1, 0, R)$ ,  $(s_0, B, s_1, 0, R)$ ,  $(s_1, 0, s_2, 1, L)$ ,  $(s_1, 1, s_1, 0, R)$ , and  $(s_1, B, s_2, 0, L)$ . For each of these initial tapes, determine the final tape when  $T$  halts, assuming that  $T$  begins in initial position.

(5 marks)



\*\*\*\*\* THE END \*\*\*\*\*

**Department of Higher Education  
University of Computer Studies  
Fourth Year (B.C.Sc. / B.C.Tech.)  
Final Examination  
Operating Systems (CS-403)  
September 2017  
Zone III**

**Answer All Questions.**

**Time Allowed: 3 Hours**

**1. Choose the correct answer.**

(10 Marks)

- (i) \_\_\_\_\_ is a unique tag, usually a number, identifies the file within the file system.  
(A) File identifier (B) File name (C) File type (D) none of the above
- (ii) An absolute path name begins at the \_\_\_\_\_.  
(A) leaf (B) stem (C) current directory (D) root
- (iii) Which of the following memory allocation scheme suffers from the External fragmentation?  
(A) Segmentation (B) Pure demand paging (C) swapping (D) paging
- (iv) A process is thrashing if \_\_\_\_\_.  
(A) it is spending less time paging than executing  
(B) it is spending more time paging than executing  
(C) page fault occurs  
(D) swapping cannot take place
- (v) An edge from process  $P_i$  to  $P_j$  in a wait for graph indicates that \_\_\_\_\_.  
(A)  $P_i$  is waiting for  $P_j$  to release a resource that  $P_i$  needs  
(B)  $P_j$  is waiting for  $P_i$  to release a resource that  $P_j$  needs  
(C)  $P_i$  is waiting for  $P_j$  to leave the system  
(D)  $P_j$  is waiting for  $P_i$  to leave the system
- (vi) In linked allocation, \_\_\_\_\_.  
(A) each file must occupy a set of contiguous blocks on the disk  
(B) each file is a linked list of disk blocks  
(C) all the pointers to scattered blocks are placed together in one location  
(D) None of these
- (vii) Effective access time is directly proportional to \_\_\_\_\_.  
(A) page-fault rate (B) hit ratio (C) memory access time (D) none of the above
- (viii) In remote file system, which of the following method is implemented for file sharing?  
(A) FTP (B) DFS (C) World Wide Web (D) all of the above
- (ix) The ways of aborting processes to eliminate deadlocks are \_\_\_\_\_.  
(A) abort all deadlocked processes  
(B) abort all processes  
(C) abort one process at a time until the deadlock cycle is eliminated  
(D) all of the above
- (x) Virtual memory is normally implemented by \_\_\_\_\_.  
(A) demand paging (B) buses (C) virtualization (D) all of the above

**2.(a) Define ANY FIVE of the followings:**

(10 Marks)

- (i) Race condition
- (ii) Mutual Exclusion
- (iii) Counting Semaphore
- (iv) Critical Section
- (v) Network Information Service
- (vi) File Control Block

(20 Marks)

2.(b) Differentiate ANY FIVE of the followings.

- (i) Counting Semaphore and Binary Semaphore
- (ii) Absolute Pathname and Relative Pathname
- (iii) Logical Address Space and Physical Address Space
- (iv) Equal Allocation and Proportional Allocation
- (v) Global Allocation and Local Allocation
- (vi) Direct access and Index access method

(20 Marks)

3. Write short notes ANY FIVE of followings.

- (i) Describe three dynamic storage allocation methods.
- (ii) Explain about the implementation of semaphore to avoid busy waiting.
- (iii) What are the methods for handling deadlock?
- (iv) Describe about the file attributes?
- (v) Briefly explain the distributed information systems in remote file systems.
- (vi) What are the advantages of bit vector?
- (vii) Describe the structure of layered file system and explain the functions of each layer.

4.(a) Consider five philosophers who spend their lives thinking and eating. The philosophers share a common circular table surrounded by five chairs, each belonging to one philosopher. In the center of the table is a bowl of rice and the table is laid with five single chopsticks. When she gets hungry and tries to pick up the tow chopsticks that are closed to her. At that time we need solution for concurrency-control. (10 Marks)

- (i) How to solve the problem by semaphore?
- (ii) What problems are remained when two neighbors are eating simultaneously?
- (iii) List the solution to the dining-philosophers problem to ensure freedom for that problem.

(10 Marks)

(b) Consider the following snapshot of the system.

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	1	1	0	0	2	1	0	1	5	2	0
P1	1	2	3	1	1	6	5	2				
P2	1	3	6	5	2	3	6	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

- (i) What is the content of Need Matrix?
- (ii) Is the system currently in a safe or unsafe state? Why?
- (iii) Is the system current in deadlock or not? Why?
- (iv) If a request from process P1 arrives for (0, 2, 1, 0) can the request be granted immediately?

5.(a) Consider a logical address space of 16 pages of 4096 words each, mapped onto a physical memory of 64 frames. (5 Marks)

- (i) How many bits are there in the logical address?
- (ii) How many bits are there in the physical address?

(b) Consider the following page-reference string: 4, 2, 0, 1, 2, 0, 5, 1, 2, 4, 3, 0, 5, 3, 0, 6, 5, 4  
How many page faults would occur for the OPT and LRU replacement algorithm with 'four' memory frames? (6 Marks)

(c) Given memory partitions of 50KB, 250KB, 100KB, 150KB, 300KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 110KB, 208KB, 60KB, and 210KB (in order)? Which algorithm makes the most efficient use of memory? (9 Marks)

\*\*\*\*\* THE END \*\*\*\*\*

**Department of Higher Education  
University of Computer Studies  
Fourth Year (B.C.Sc. / B.C.Tech.)  
Final Examination  
Operating Systems (CS-403)  
September 2017  
Zone III**

**Answer All Questions.**

**Time Allowed: 3 Hours**

**1. Choose the correct answer.**

(10 Marks)

- (i) \_\_\_\_\_ is a unique tag, usually a number, identifies the file within the file system.  
(A) File identifier (B) File name (C) File type (D) none of the above
- (ii) An absolute path name begins at the \_\_\_\_\_.  
(A) leaf (B) stem (C) current directory (D) root
- (iii) Which of the following memory allocation scheme suffers from the External fragmentation?  
(A) Segmentation (B) Pure demand paging (C) swapping (D) paging
- (iv) A process is thrashing if \_\_\_\_\_.  
(A) it is spending less time paging than executing  
(B) it is spending more time paging than executing  
(C) page fault occurs  
(D) swapping cannot take place
- (v) An edge from process  $P_i$  to  $P_j$  in a wait for graph indicates that \_\_\_\_\_.  
(A)  $P_i$  is waiting for  $P_j$  to release a resource that  $P_i$  needs  
(B)  $P_j$  is waiting for  $P_i$  to release a resource that  $P_j$  needs  
(C)  $P_i$  is waiting for  $P_j$  to leave the system  
(D)  $P_j$  is waiting for  $P_i$  to leave the system
- (vi) In linked allocation, \_\_\_\_\_.  
(A) each file must occupy a set of contiguous blocks on the disk  
(B) each file is a linked list of disk blocks  
(C) all the pointers to scattered blocks are placed together in one location  
(D) None of these
- (vii) Effective access time is directly proportional to \_\_\_\_\_.  
(A) page-fault rate (B) hit ratio (C) memory access time (D) none of the above
- (viii) In remote file system, which of the following method is implemented for file sharing?  
(A) FTP (B) DFS (C) World Wide Web (D) all of the above
- (ix) The ways of aborting processes to eliminate deadlocks are \_\_\_\_\_.  
(A) abort all deadlocked processes  
(B) abort all processes  
(C) abort one process at a time until the deadlock cycle is eliminated  
(D) all of the above
- (x) Virtual memory is normally implemented by \_\_\_\_\_.  
(A) demand paging (B) buses (C) virtualization (D) all of the above

**2.(a) Define ANY FIVE of the followings:**

(10 Marks)

- (i) Race condition
- (ii) Mutual Exclusion
- (iii) Counting Semaphore
- (iv) Critical Section
- (v) Network Information Service
- (vi) File Control Block

2.(b) Differentiate ANY FIVE of the followings.

(20 Marks)

- (i) Counting Semaphore and Binary Semaphore
- (ii) Absolute Pathname and Relative Pathname
- (iii) Logical Address Space and Physical Address Space
- (iv) Equal Allocation and Proportional Allocation
- (v) Global Allocation and Local Allocation
- (vi) Direct access and Index access method

3. Write short notes ANY FIVE of followings.

(20 Marks)

- (i) Describe three dynamic storage allocation methods.
- (ii) Explain about the implementation of semaphore to avoid busy waiting.
- (iii) What are the methods for handling deadlock?
- (iv) Describe about the file attributes?
- (v) Briefly explain the distributed information systems in remote file systems.
- (vi) What are the advantages of bit vector?
- (vii) Describe the structure of layered file system and explain the functions of each layer.

4.(a) Consider five philosophers who spend their lives thinking and eating. The philosophers share a common circular table surrounded by five chairs, each belonging to one philosopher. In the center of the table is a bowl of rice and the table is laid with five single chopsticks. When she gets hungry and tries to pick up the tow chopsticks that are closed to her. At that time we need solution for concurrency-control.

(10 Marks)

- (i) How to solve the problem by semaphore?
- (ii) What problems are remained when two neighbors are eating simultaneously?
- (iii) List the solution to the dining-philosophers problem to ensure freedom for that problem.

(b) Consider the following snapshot of the system.

(10 Marks)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	1	1	0	0	2	1	0	1	5	2	0
P1	1	2	3	1	1	6	5	2				
P2	1	3	6	5	2	3	6	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

- (i) What is the content of Need Matrix?
- (ii) Is the system currently in a safe or unsafe state? Why?
- (iii) Is the system current in deadlock or not? Why?
- (iv) If a request from process P1 arrives for (0, 2, 1, 0) can the request be granted immediately?

5.(a) Consider a logical address space of 16 pages of 4096 words each, mapped onto a physical memory of 64 frames.

(5 Marks)

- (i) How many bits are there in the logical address?
- (ii) How many bits are there in the physical address?

(b) Consider the following page-reference string: 4, 2, 0, 1, 2, 0, 5, 1, 2, 4, 3, 0, 5, 3, 0, 6, 5, 4  
How many page faults would occur for the OPT and LRU replacement algorithm with 'four' memory frames?

(6 Marks)

(c) Given memory partitions of 50KB, 250KB, 100KB, 150KB, 300KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 110KB, 208KB, 60KB, and 210KB (in order)? Which algorithm makes the most efficient use of memory?

(9 Marks)

\*\*\*\*\* THE END \*\*\*\*\*

**Department of Higher Education**  
**University of Computer Studies**  
**Fourth Year (B.C.Sc.)**  
**Final Examination**  
**Management Information System (CS-404)**  
**September, 2017**  
**Zone III**

**Answer All Questions.**

**Time Allowed: 3 Hours**

- 
1. Choose the correct answer(s) from the following. **(15-marks)**
- (1) Which of the following systems deals with planning for, development, management, and use of information technology tools for management?
- A. Strategic Support Systems      B. Operational Systems  
C. Administrative Systems      D. Management Information Systems
- (2) Which type of technology allows you to send information from one computer to another?
- A. Output      B. Telecommunication      C. Connecting      D. CPU
- (3) Information technology plays a critical role in helping organizations:
- A. maintain the existing bureaucratic structure      B. work with nonroutine tasks  
C. develop better-educated employee groupings      D. perceive environmental change
- (4) All organizations become very efficient over time because individuals in the firm develop:
- A. routines for producing goods and services      B. long lasting friendships within the firm  
C. better-educated employee groupings      D. deep rooted cultures
- (5) A virtual organization is a (n):
- A. entity that grows larger because it can conduct marketplace transactions internally more cheaply than it can with external firms in the marketplace.  
B. system of formal functions that include planning, organizing, coordinating, deciding and controlling.  
C. system of management based on the observation of what managers actually do in their jobs.  
D. system that uses networks to link people, assets and ideas to create and distribute products and services without being limited to traditional organizational boundaries or physical locations
- (6) All company activities are classified as either primary or support by the:
- A. behavioral model      B. competitive forces model  
C. value web model      D. value chain model
- (7) When a company aims to distinguish the superior attributes of its product or service from that offered by the competition, it is pursuing the \_\_\_\_\_ strategy.
- A. differentiation      B. Cost Leadership      C. Focused Differentiation      D. Cost Focus
- (8) Which of the following is **not** part of the external marketing environment?
- A. Political      B. Legal      C. Product      D. Socio-cultural
- (9) The interaction between information technology and organizations is very complex and is influenced by a great many mediating factors, including the organization structure, business processes, politics, culture, management decisions and:

- A. the surrounding environment.                      B. the economic basis of the company.  
 C. the availability of trained employees.        D. the cash flow within the company.
- (10) Information systems managers are:  
 A. highly-trained technical specialists who write computer software instructions.  
 B. specialists who translate business problems and requirements into information requirements and systems.  
 C. leaders of the various specialists in the information system department.  
 D. in charge of the information systems function in the organization.
- (11) When a firm provides a specialized product or service for a narrow target market better than competitors, they are using a:  
 A. product differentiation strategy.                      B. focused differentiation strategy.  
 C. value web strategy.    D. customization strategy.
- (12) An information system can enhance core competencies by:  
 A. providing better reporting facilities.  
 B. creating educational opportunities for management.  
 C. allowing operational employees to interact with management.  
 D. encouraging the sharing of knowledge across business units.
- (13) The \_\_\_\_\_ model is used to describe the interaction of external influences, specifically threats and opportunities that affect an organization's strategy and ability to compete.  
 A. network economics        B. competitive forces  
 C. strategic transitions        D. environmental conditions
- (14) \_\_\_\_\_ is the software that supports a business group whose members work on interconnected personal workstations.  
 A. Project team                      B. End-users                      C. Project management                      D. Groupware
- (15) \_\_\_\_\_ process the company's business transactions and thus support the operations of an enterprise.  
 A. Transaction processing systems                      B. Management reporting systems  
 C. Electronic document interchange                      D. Document management system

2. Write short notes for **Any Four** of the followings: **(20-marks)**
- a) Benefit of telecommuting
  - b) List of possible business results from information systems
  - c) Time-based competition
  - d) Key success of a strategic information system
  - e) Electronic meeting systems
  - f) What is two classes of transaction documents and explain each of these document?

3. Answer **Any Two** questions. **(20-marks)**
- a) What are the advantages and drawbacks of functional structure and divisional structure of virtual organization as compared with the traditional organizational structure?
  - b) What is the Electronic Data Interchange (EDI)? What are the necessary components of EDI implementation?
  - c) Define the main objective of Management Reporting Systems (MRS). What are the principal characteristics of MRS?

4. Answer all questions.

(30-marks)

- a) What is the value chain? What are the typical strategic information systems deployed in the **two Logistics** stages of a value chain with shown in figure?

(OR)

List the **four** competitive strategies and illustrate how an information system may help in realizing each of them with shown in figure?

- b) In Office Information System, some applications require storage and management of document image and other applications rely on storage and management of document text. Explain in detail with the advantages and drawbacks of text representation as compared to image representation with two figures.

5. Mini case Study for point-of-sales systems of Wal-Mart Stores.

(15-marks)

Wal-Mart Stores use the point-of-sales system, which supports the operations conducted at sales registers. An information system automatically triggers electronic orders for store merchandise to be replenished, that go from Wal-Mart's computers directly to the computers of the firm's suppliers. The massive volume of data acquired daily by these operational information systems from billions of sale transactions are processed to provide the firm's managers with the ability to plan the development of new stores and make sure that the existing ones are properly operated. Using this information and supported in their knowledge work by specialized information systems for market research, the firm's managers are able to see summary reports on past and current to make decisions for planning future activities, the company's marketing specialists can plan cost-effective advertising campaigns for the coming season.

- a) What types of information systems could be used for Wal-Mart Stores?  
b) How does Wal-Mart Stores manage with each of information systems?  
c) What are the capabilities of information systems in theory?  
d) After the Wal-Mart Stores deployed these information systems, how it outcomes to achieve business results?

\*\*\*\*\*END\*\*\*\*\*



**Department of Higher Education**  
**University of Computer Studies**  
**Fourth Year (B.C.Sc.)**  
**Final Examination**  
**Unified Modeling Languages (CS-405)**  
**September 2017**  
**Zone III**

Answer All Questions.

Time Allowed: 3 Hours

1. Choose the correct answer for the following statements.

(20-marks)

1. UML is informed by a vision of the structure of software systems known as the \_\_\_\_ model.  
(a) 1+4 view ✓ (b) 4+1view (c) 5+1view (d) 3+1view
2. \_\_\_\_ features can also be used in descendants of the owning class.  
✓(a) protected (b) private (c) public (d) package
3. Multiplicity information should be shown on \_\_\_\_\_.  
✓(a) associations (b) generalizations (c) specialization (d) none of these
4. Two kinds of diagrams are defined in UML for showing interactions, \_\_\_\_\_ diagrams.  
(a) class and object (b) sequence and collaboration ✓  
(c) use case and activity (d) component and deployment
5. Composition is a strong form of \_\_\_\_ in which the 'part' objects are dependent on the 'whole' objects.  
(a) association (b) operation (c) aggregation ✓ (d) generalization
6. The design view describes the \_\_\_\_ structure that support the functional requirements expressed in the use case view. ✓  
(a) external (b) logical (c) physical (d) none of these
7. Component diagrams show components and the relationships between them, modeled by \_\_\_\_\_.  
(a) artefacts (b) dependencies ✓ (c) interfaces (d) none of these
8. In sequence diagram, the period of time during which an object is processing a message is known as \_\_\_\_\_.  
(a) Lifeline (b) Activation ✓ (c) Return (d) Transition
9. \_\_\_\_ means that one case is included whenever one of the other use case is performed.  
✓(a) Use case inclusion (b) Use case extension (c) Generalization (d) Use case description
10. \_\_\_\_ can be used to simplify the structure of a state chart, by factoring out common behavior.  
✓(a) Composite States (b) Mapper (c) Observer (d) Component ✓
11. Abstract classes are classes that are intended to have instances. (True/False)
12. Realization of the use case is an object. (True/False) ✓
13. A class describes a set of objects that share the same structure and properties. (True/False) ✓
14. Guard conditions can be used to specify which one out of a set of transitions actually fires on a particular occasion. (True/False)
15. Exit actions are performed every time a state becomes active. (True/False) ✓
16. Association roles connect classifier roles in collaborations and indicate how objects can be linked, and hence exchange messages, in interactions. (True/False)
17. Classes are defined at compile-time, but objects are created at run-time, as instances of classes. (True/False)
18. Data types can also be defined as enumerations, which are essentially the same as the enumerated types provided in many programming languages. (True/False) ✓
19. The 'trace' stereotype denote a dependency between two model elements that represent the different concept. (True/False) ✓
20. The general UML notation allows an association to connect any number of classes, the majority of associations used are binary, connecting only two classes. (True/False)

2. Write the short notes on the differences between ANY FOUR of the following pairs: (20 Marks)

- (a) Class and Abstract
- (b) Boundary object and Control object
- (c) Classifier role and Association role
- (d) Entry action and Exist action
- (e) Include dependency and Extend dependency
- (f) Aggregation and Composition

3. Of-the-Month Club (OTMC) is an innovative young firm that sells memberships to people who have an interest in certain products/services. People pay membership fees for one year and the club sends them a special product of their interest each month. For example, OTMC has a coffee-of-the month club that sends members one pound of special coffee each month. OTMC currently has six products of memberships; coffee, wine, beer, cigars, flowers, and computer games and each of which costs a different amount. Customers usually belong to just one product, but some belong to two or more products. When people join OTMC, the telephone operator records the name, mailing address, phone number, email address, credit-card information, start date, and membership product(s), e.g., coffee.

- (a) Draw the UML use case diagram for the above system. (10 marks)
- (b) Define the major tasks and write use case diagram description of (a). (5 marks)

4. Consider the world of libraries. A library has books, videos and CDs that it loans to its users. All library material has an id and a title. In additions, books have one or more authors, videos have one or more actors, while CDs have one or more entertainers. The library maintains one or more copies of each library item (books, video, or CD). Copies of all library materials can be loaned to users. References-only material is loaned for 2hrs and can't be removed from the library. Other material can be loaned for 2 weeks. For every loan, the library records the user's id, the loan date and the return date. The library maintains users' names, address and phone number. (15 marks)

- (a) Draw a class diagram for the library case above. Make sure to show attributes, multiplicities and aggregation/ compositions, where appropriate. No need to show any operations.
- (b) Draw object diagram for the book is loaned from the library, with dummy data members and the relation between them.

User user = new User ('U1022', "Mr. Brown", "23 Avenu, Buston", "859985637");

Book Lbook = new Book ('BSc2256', "Science of Computing", "Copies-2");

Loan loan1 = new loan1('U1022', 'BSc2256', 'Copies-2', "12/03/2017", "26/03/2017");

5. Assume that you have to develop a computer system for the library described in No.(4) above. Only members of the library may borrow books. The system checks whether the potential borrower is a member of the library, and whether there is no reservation on the book. If both check succeed the system records that the book is on loan. Otherwise if refuses the loan. A member may ask to extend the loan of the book. The system then checks whether there is a reservation on the book. If so, the system refuses to extend the loan. Otherwise it records the extension of the loan.

- (a) Draw the sequence diagram and collaboration diagram that shows scenario of borrowing books. (15 marks)
- (b) Draw a state chart diagram and write a scenario summarizing the information given in the following description of an automatic washing machine.

The washing machine is in **idle** state, when power on otherwise it is in **off** state. In this state, user can choose washing plans such as **regular** or **delicate** or **super delicate**. When user press **Start** after setting the washing plan, it turns the light on and does the washing procedures as follows. If user sets the **regular** washing plan, the machine starts to soak in the water (pump in) for **30 mins**, then it starts rinsing (washing) by stirring for another **30 mins**. If user sets the delicate or super delicate washing plan, the machine skips the soak in process and starts rinsing (washing) by stirring for **30 mins**. After the rinse process is stopped and it starts draining (pump out) for **5 mins**. If the washing plan is super delicate, after draining, it turns the light off and back to idle state. Other washing plans continue to dry process by stirring for **10 mins**. After drying, it turns light off and back to idle state. **(15 marks)**

\*\*\*\*\*END\*\*\*\*\*

**Department of Higher Education**  
**University of Computer Studies**  
**Fourth Year (B.C.Sc.)**  
**Final Examination**  
**Computer Graphics (CS-406)**  
**September 2017**  
**Zone III**

**Answer All Questions.**

**Time Allowed: 3 Hours**

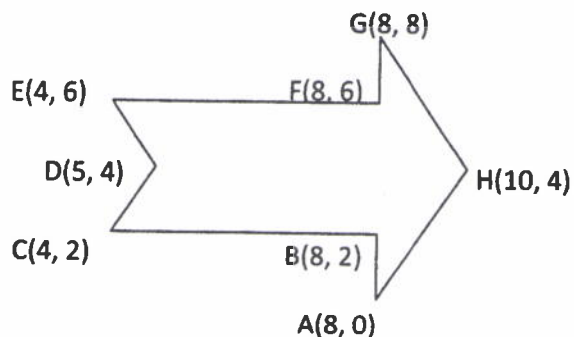
**1. Choose the correct answer(s) of the followings:**

**(15 Marks)**

- (i) The primary output device in a graphics system is \_\_\_\_\_.  
A. scanner                      B. video monitor                      C. keyboard                      D. printer
- (ii) Lower persistence phosphorus is used in \_\_\_\_\_.  
A. animation                      B. simple object                      C. complex object                      D. all of these
- (iii) The technique to minimizing aliasing are \_\_\_\_\_.  
A. increased number of resolution                      B. modify pixel intensities  
C. super sampling                      D. all of these
- (iv) To efficiently perform polygon fill, we can first store the polygon boundary in a \_\_\_\_\_ that contains all the information necessary to process scan line efficiently.  
A. memory                      B. frame buffer                      C. active edge list                      D. sorted edge table
- (v) In the calculation of all point in a circle, computation step can be reduced by considering the \_\_\_\_\_ of circle.  
A. quadrant                      B. octants                      C. circumference                      D. symmetry
- (vi) The basic geometric structures that describes a scene on display is called \_\_\_\_\_.  
A. attributes                      B. output primitive                      C. transformation                      D. translation
- (vii) Super sampling technique is \_\_\_\_\_.  
A. prefiltering                      B. postfiltering                      C. aliasing                      D. pixel phasing
- (viii) The basic attributes of a straight line segment are \_\_\_\_\_.  
A. type                      B. width                      C. color                      D. all of these
- (ix) \_\_\_\_\_ stores the picture information as a charge distribution behind the phosphor-coated screen.  
A. Cathode ray tube                      B. Direct-view storage tube  
C. Flat panel displays                      D. 3D viewing device
- (x) The transformation that is used to alter the size of an object is \_\_\_\_\_.  
A. scaling                      B. rotation                      C. translation                      D. reflection
- (xi) The region code of a point within the window is \_\_\_\_\_.  
A. 1111                      B. 0000                      C. 1000                      D. 0010
- (xii) The mapping of a part of a world-coordinate scene to device coordinate is referred to as a \_\_\_\_\_.  
A. window                      B. view port                      C. viewing transformation                      D. normalization
- (xiii) A composite transformation matrix can be made by determining the \_\_\_\_\_ of matrix of the individual transformation.  
A. sum                      B. product                      C. difference                      D. none of the above
- (xiv) Two consecutive translation transformation  $t_1$  and  $t_2$  are \_\_\_\_\_.  
A. additive                      B. multiplicative                      C. subtractive                      D. none of the above
- (xv) Line clipping algorithm is \_\_\_\_\_.  
A. Cohen-Sutherland algorithm                      B. Liang-Barsky clipping  
C. Nicholl-Lee-Nicholl clipping                      D. all of the above

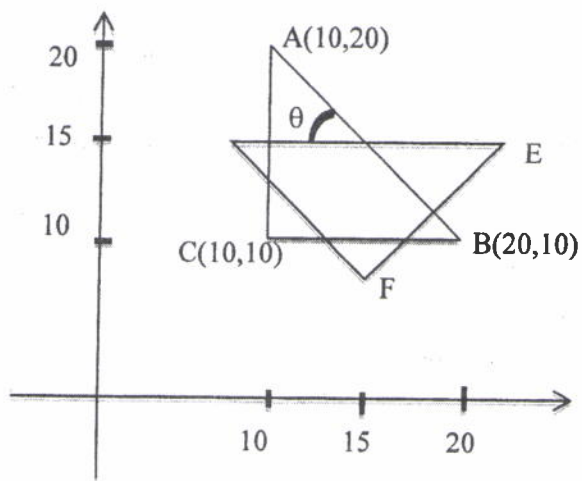
2. What are the two principal applications of image processing and how to apply image processing methods in computer graphics. (5 Marks)
- 3.(a) What is the fraction of the total refresh time per frame spent in retrace of the electron beam for a non interlaced raster system with a resolution of 1280 by 1024, a refresh rate of 80 Hz, a horizontal retrace time of 6 microseconds, and a vertical retrace time of 600 microseconds? (8 Marks)
- (b) On an Interlaced Raster System, how much time is spent scanning across all the odd rows of pixels during screen refresh with a resolution of 1280 by 1024 and a refresh rate of 60 frames per second? (7 Marks)

- 4.(a) Use Bresenham's line algorithm, derive the decision parameters  $p_0, p_k, p_{k+1}$  for generating points along a straight line path with slope  $|m| > 1$ . (9 Marks)
- (b) Construct the sorted edge table for the given polygon in the following figure. For each edge, the following information need to be kept in table. The maximum y value of the two vertices, the 'x' value associated with the minimum 'y' value, the inverse slope of the edge and the address for the next edge. (5 Marks)



- (c) Explain how we can apply the nonzero winding number rule to identify the interior region of polygon with example. (6 Marks)
- 5.(a) Suppose you have a system with an 8-inch by 10-inch video screen that can display 100 pixels per inch. If a color lookup table with 64 positions is used with this system, what is the smallest possible size (in bytes) for the frame buffer? (5 Marks)
- (b) Suppose you have a system with 8 inches by 10 inches video screen that can display 100 pixels per inches. In a color lookup table, each pixel can reference any one of the 512 table positions, and each entry in the table use 24 bits to specify any RGB color. (5 Marks)
- (i) How many different colors could we display at any one time?
  - (ii) What is the smallest possible size (in byte) for the frame buffet?
  - (iii) What is total memory size?

- 6.(a) Compute the form of the transformation matrix that should be applied to all of the original object A(10,20), B(20,10) and C(10,10). Find all of the new points of the transformed object D, E and F if  $\theta = 30$  from a fixed point (15,15). (7 Marks)



- (b) Determine the form of transformation matrix for a reflection about an arbitrary line with equation  $y = mx + b$ . (10 Marks)
- (c) Describe the transformation matrix of the reflection axis as the diagonal line  $y = x$ . (3 Marks)

7.(a) Let  $W$  be the rectangular window whose lower left-hand corner is at  $L(0, 0)$  and upper right-hand corner is at  $R(10,5)$ . Find the region codes for the endpoints  $AB$  where  $A(-3, -4)$  and  $B(12, 9)$ . Use the Cohen-Sutherland clipping algorithm to clip line  $AB$  and write down all your calculation steps. (8 Marks)

(b) Consider a photographer is taking a shoot to a model in his studio. The studio room size is from lower left corner,  $(0,0)$  to upper right corner,  $(100,100)$ . The model position is about  $(30,30)$ . Identify the new point location of the model, which will be appeared in the camera, whose lower left corner is  $(0,0)$  and upper right corner is  $(5,5)$  using the window to viewport coordinate transformation. (7 Marks)

\*\*\*\*\* THE END \*\*\*\*\*