

**COMPUTER SCIENCE
FOR CAPE
UNIT 2
PAPER 1 PAST PAPERS**

BATCH #2

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1. A queue is a data structure in which elements
- can only be added to the front and removed from the rear
 - can only be added and removed from the rear
 - can only be added and removed from the front
 - can only be added to the rear and removed from the front
2. In a binary search
- the number of items being searched is halved on every iteration
 - the list of data items is searched randomly
 - the list of data items is searched one by one until the target is found or the list is exhausted
 - the list of data items may be unordered
3. Which of the following is TRUE for BOTH a linear search and a binary search?
- On average they search half the list.
 - In the worst case scenario they search the entire list.
 - They can be used for searching an ordered list.
 - They require that the list be ordered.
4. Which of the following statements is a specification of a set of data and the set of operations that can be performed on the data?
- Library
 - ADT
 - Package
 - Tracer
5. Which of the following statements is TRUE?
- The bubble sort performs better than selection sort on longer lists.
 - The selection sort performs better on a partially ordered list than a completely unordered list.
 - The bubble sort is very simple and therefore very efficient.
 - The selection sort performs the same regardless of the size of the list.
- Item 6 refers to the diagram below which shows two items stored in a queue.
- Initial State
-
- FRONT REAR
- | | | | |
|---|---|--|--|
| H | J | | |
|---|---|--|--|
- Final State
-
- FRONT REAR
- | | | | |
|--|---|---|---|
| | J | K | L |
|--|---|---|---|
6. Which sequence of operations would transform the queue from the initial state to the final state shown below?
- DEQUEUE, ENQUEUE(K), ENQUEUE(L)
 - ENQUEUE(L), ENQUEUE(K), DEQUEUE
 - DEQUEUE, DEQUEUE, ENQUEUE(L), ENQUEUE(K), ENQUEUE(J)
 - DEQUEUE, DEQUEUE, ENQUEUE(J), ENQUEUE(K), ENQUEUE(L)

Item 7 refers to the diagram below.

1	6	9	14	17	20	22
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7. The target value is 19. A binary search is employed. What is the second value to be compared with the target value, 19?

- (A) 14
- (B) 17
- (C) 20
- (D) 22

Item 8 refers to the diagram below.

A	C	E	F	G	K	L
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8. The target value is I. A binary search is employed. How many comparisons are made before we can conclude that letter I does not appear in the list?
- (A) 2
 - (B) 3
 - (C) 4
 - (D) 7

9. A queue is implemented using an array. A procedure to add an element to the queue would involve
- (A) incrementing the pointer to the front of the queue
 - (B) incrementing the pointer to the rear of the queue
 - (C) decrementing the pointer to the front of the queue
 - (D) decrementing the pointer to the rear of the queue

Item 10 refers to a segment of an algorithm for performing a linear search for *target* on an array with size *n*.

```

count = 0
flag = false
REPEAT
    IF (list[count] = target) THEN
        I
    END IF
    II
UNTIL flag=true or III
IF flag = false THEN
    IV
END IF

```

10. Which of the following sequence of steps would complete the procedure?

- (A) I – flag = true
II – add 1 to count
III – count = n – 1
IV – WRITE target not found
- (B) I – flag = true
II – add 1 to count
III – count = n
IV – WRITE target not found
- (C) I – flag = true
II – add 1 to count
III – count = n – 1
IV – WRITE target found
- (D) I – flag = true
II – add 1 to count
III – count = n
IV – WRITE target found

Items 11–12 refer to the following scenario.

A student is asked to implement a stack using arrays. The student develops the following operations and programming statements.

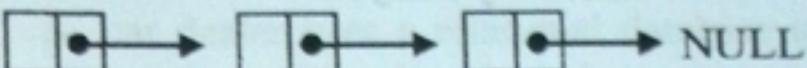
Operation:

`push(ele)`
`pop()`

- I. `return ele`
- II. `if ptr != array_size`
- III. `ptr = ptr + 1`
- IV. `ptr = ptr - 1`
- V. `ele = data [ptr]`
- VI. `ele = data [ptr + 1]`
- VII. `data [ptr] = ele`
- VIII. `data [ptr - 1] = ele.`
- IX. `if (ptr != 0)`

In the above, 'data' refers to the array which stores the data, 'ptr' is the address of the last element inserted into the Stack and 'ele' is the data element being acted on.

- 11.** Which ordering below gives a working implementation for the 'push (ele)' operation?
- (A) VIII, III, I
 - (B) VII, IV, II
 - (C) II, III, VII
 - (D) II, I, III
- 12.** Which ordering below gives a working implementation for the 'pop ()' operation?
- (A) IX, V, III, I
 - (B) II, V, IV, I
 - (C) VI, IV, II, I
 - (D) IX, V, IV, I

Items 13–14 refer to the diagram below.

- 13.** What is the Abstract Data Type depicted above?

- (A) Stack
- (B) Queue
- (C) Enum
- (D) Linked list

- 14.** Which of the following operations is associated with the ADT above?

- (A) Insert
- (B) Enqueue
- (C) Dequeue
- (D) Pop

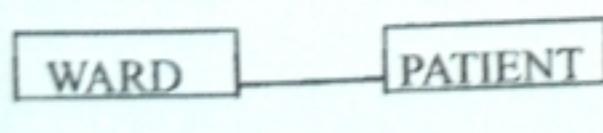
- 15.** A software firm is designing a program to simulate the arrival and departure of customers at a supermarket check-out counter. Which of the following data structures is the MOST appropriate to achieve this objective?

- (A) Stack
- (B) Queue
- (C) Array
- (D) Tree

- 16.** Software that is NOT associated with the wasting of resources is said to have the property of

- (A) efficiency
- (B) reliability
- (C) dependability
- (D) usability

17. Which of the following is TRUE of a feasibility study?
- (A) It describes a cost effective means of developing the proposed system.
 - (B) It discusses whether the proposed system will be cost effective.
 - (C) It is usually a lengthy and costly process.
 - (D) It describes how current software and hardware can be used to develop the proposed system.
18. Which of the following design processes refers to the identification of subsystems and their relationships?
- (A) Architectural
 - (B) Component
 - (C) Data structure
 - (D) Interface
19. One of the MAIN weaknesses of the waterfall model is that it
- (A) requires significant technical support
 - (B) encourages an increase in project size
 - (C) is an inflexible development model
 - (D) consumes a lot of time and resources
20. Which of the following are the essential features of well-engineered software?
- (A) Security, portability, efficiency, usability
 - (B) Maintainability, dependability, efficiency, usability
 - (C) Reusability, security, maintainability, portability
 - (D) Reliability, user friendliness, efficiency, portability
21. Which of the following is NOT a recognized technique for determining software requirements?
- (A) Research through the Internet
 - (B) Interviews with end users
 - (C) Questionnaires
 - (D) Observation
22. Constructs of an entity-relationship diagram are
- (A) entity, relationship
 - (B) entity, relationship, flow
 - (C) entity, attribute, relationship
 - (D) entity, attribute, relationship, flow
23. Which of the following statements is true of data flow diagrams?
- (A) Data cannot be moved directly from one store to another.
 - (B) A data flow may flow in both directions between two symbols.
 - (C) A process can have only one output.
 - (D) A data flow to a store means retrieve or use.
24. Which of the following is LEAST helpful in an error message presented to a user?
- (A) System-specific terms
 - (B) User-oriented language
 - (C) Many options for recovery
 - (D) Description of the error
25. Which of the following describe the contents of an entry in a data dictionary?
- I. The name of the element
 - II. The type and format of the element
 - III. A list of related elements
 - IV. A textual description of the element
- (A) I and II only
 - (B) I, II and III only
 - (C) I, II and IV only
 - (D) I, II, III and IV

26. Which life cycle model approach is BEST suited to a system with critical safety and security requirements?
- Waterfall approach, since software is well structured
 - Evolutionary development, since any security problems can be easily rectified by creating a new system
 - Fountain approach, since any security problems can be easily rectified by further iterations
 - Formal transformation, since it can be proven that the system fulfills requirements
27. A small company with fewer than ten employees is interested in replacing its existing paper-based system with a software application. Which of the following is MOST appropriate for gathering information during analysis?
- Distributing questionnaires to employees and clients of the company
 - Researching company practices on the Internet
 - Interviewing priority clients of the company
 - Interviewing key people at the company
28. A hospital keeps data on patients, wards and staff. Which of the ER diagrams below BEST shows the relationship between patients and wards?
-  A simple 1:1 relationship between two entities, PATIENT and WARD, connected by a single line.
 -  A 1:M relationship where PATIENT is the 1 side and WARD is the M side, indicated by a line with a crow's foot symbol at the WARD end.
 -  A M:1 relationship where WARD is the M side and PATIENT is the 1 side, indicated by a line with a crow's foot symbol at the PATIENT end.
 -  A simple 1:1 relationship between two entities, WARD and PATIENT, connected by a single line.

Items 29–30 refer to the following scenario.

A car dealer uses a relational database to store data on the orders made by customers, the types of cars in stock and payments made.

29. How many entities can be identified?
- One
 - Two
 - Three
 - Four
30. What type of relationship exists between the customer and payments?
- One to many
 - Many to one
 - One to one
 - Many to many
31. A process is said to be blocked when
- the CPU is unavailable
 - it has now entered the system
 - it is waiting for I/O and cannot use the CPU even if it were free
 - processes with higher priority are given CPU time
32. Two processes are said to be deadlocked when
- they are awaiting I/O
 - they are denied CPU time by processes with higher priority
 - neither can proceed because each is waiting on the other to do something
 - they are about to be killed

33. What is 'firewire'?

- (A) A type of cabling that allows communication between computers.
- (B) Software running on a computer that protects it from external attacks.
- (C) A type of virus.
- (D) A high-speed data serial bus.

34. What term refers to a state when an excessive amount of CPU time is spent swapping data between RAM and auxiliary storage?

- (A) Thrashing
- (B) Partitioning
- (C) Fragmenting
- (D) Paging

35. What is the name given to the network topology in which EACH node is connected to a central host computer which controls the network?

- (A) Centered
- (B) Star
- (C) Ring
- (D) Bus

36. What feature enables a user to run multiple programs, such as a web browser, word processor and media player if RAM is too small to hold them all?

- (A) Folders
- (B) Cache
- (C) Buffers
- (D) Virtual memory

37. An 'interrupt' may BEST be described as

- (A) a period in time when CPU does nothing
- (B) a signal sent to get CPU attention
- (C) a time when a process is blocked
- (D) a signal sent when a process is complete

38.

A user wants to send a large file over a LAN. What measure can the user employ to transmit the file efficiently over the network?

- (A) Encryption
- (B) Modem
- (C) Data compression
- (D) Password

39.

Which of the following lists of layers are collectively responsible for addressing, routing and transmitting data between nodes?

- (A) Physical, datalink, network
- (B) Physical, datalink
- (C) Datalink, network, transport
- (D) Network, transport

40.

A client is interested in setting up a wireless LAN for his place of business. Very high data rates (30Mbps-40Mbps) are critical to the network applications of this business. Which standard should be employed, 802.11a or 802.11b?

- (A) 802.11a since it can support the desired data rates.
- (B) 802.11b since it can support the desired data rates.
- (C) 802.11a or 802.11b will give similar performance, these standards do not differ in data rates.
- (D) Neither 802.11a or 802.11b since they do NOT support transmission over a large distance.

41. Which of the following is true about a process being scheduled with a non-preemptive algorithm?
- (A) It is placed at the top of the ready queue if it has a higher priority than all the processes already in the queue.
 - (B) Once it enters the running state, it is allowed to run to completion or until it yields the processor.
 - (C) Once it enters the running state, it is given a fixed amount of time to use the CPU after which other processes get a chance to use the CPU.
 - (D) Once it enters the running state, it is given a variable amount of time to use the CPU depending on its priority.
42. A client suspects suspicious activity with respect to his network containing computers which frequently access the Internet. Which of the following should he implement?
- (A) Activity logs
 - (B) Firewall
 - (C) Firewire
 - (D) Passwords
43. Which of the following is NOT a function of an operating system?
- (A) User interface
 - (B) Resource management
 - (C) Document creation
 - (D) User security
44. A round-robin scheduling algorithm is used. The amount of time a process gets to use the CPU when its turn comes is dependent on
- (A) the order of arrival of the process on the ready queue
 - (B) the priority of the process
 - (C) the estimated running time of the process
 - (D) a certain amount of time fixed by the operating system
45. A running process initiates an input request to get data from the keyboard. Which of the following state transitions will take place when the data is made available?
- (A) Ready to running
 - (B) Running to ready
 - (C) Blocked to ready
 - (D) Blocked to running

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.