In the Name of Allah, the Most Beneficent, the Most Merciful.

OPTIMAL
IT JOB SOLUTION

RECENT IT
QUESTION BANK

2025-2024

COMPUTER SCIENCE AND ENGINEERING

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Bangladesh Satellite Company Limited
Assistant Engineer (CSE) 2025
Exam Taker: BUET Exam Date: 23/08/2025
Exam Time: 1 Hour

1. Write a function to find minimum number from an array, return minimum value as argument.
Ans:

```
int findMin(int arr[], int n) {
    int min = arr[0];
    for (int i = 1; i < n; i++) {
        if (arr[i] < min) {
            min = arr[i];
        }
    }
    return min;
}
```

2. 10Mbps bandwidth, average packet length 1500 bytes, what is maximum packet arrival rate supported without causing congestion .
Ans:
Bandwidth: 10 Mbps = 10×10^6 bits/sec

Packet size: 1500 bytes = $1500 \times 8 = 12{,}000$ bits

Maximum rate:

$$\text{Max packets/sec} = \frac{10,000,000}{12,000} \approx 833\ pps$$

Answer is About 833 packets per second (pps) can be handled without congestion.

3. Write Concepts of coupling and cohesion with example .
Ans:
Cohesion refers to how closely the tasks within a single module are related. A highly cohesive module focuses on one specific responsibility, making it easier to understand and maintain.

- **কুসংস্কার**
- **ব্যাকুল**

বাগধারা (৫টি):

লেফাফা দুরস্ত, দুধের মাছি, ভিজে বেড়াল, গাছপাথর, বিড়াল তপস্বী।

Ans:

লেফাফা দুরস্ত — যথাযথভাবে প্রস্তুত

দুধের মাছি — অপছন্দনীয় ব্যক্তি

ভিজে বেড়াল — অসহায় অবস্থা

গাছপাথর — নির্বোধ

বিড়াল তপস্বী — ছদ্মবেশী খারাপ লোক

ইংরেজি (১৫)

১. Right form of verb – ৫ নম্বর

২. Sentence Correction – ৫ নম্বর

৩. Phrase with sentence – ৫ নম্বর

- **Down to earth**
- **A slow coach**
- **Play fast and loose**
- **Achilles' heel**
- **Once in a blue moon**

Ans:

Down to earth – She is very **down to earth** despite being rich.

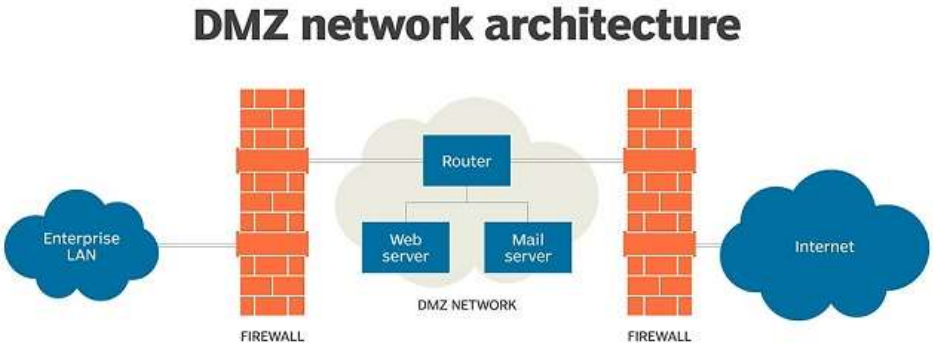
A slow coach – My brother is such **a slow coach** when getting ready.

Play fast and loose – Don't **play fast and loose** with people's emotions.

Achilles' heel – His anger is his **Achilles' heel**.

Once in a blue moon – We go on a vacation **once in a blue moon**.

In computer networks, a DMZ, or demilitarized zone, is a physical or logical subnet that separates a local area network (LAN) from other untrusted networks -- usually, the public internet. DMZs are also known as perimeter networks or screened subnetworks.



Sandbox:A sandbox is a secure environment where untrusted programs or code can be run and tested without affecting the rest of the system. It isolates the execution to prevent any potential harm.

3. Difference between Alpha, Beta & Gama in software testing.

Ans:

	Alpha	Beta	Gamma
Why?	Validate software in all perspective, ensure readiness for beta testing	Get end users feedback, ensure readiness for release	Check software readiness to the specified requirements
When?	At the end of development process	After alpha testing	After beta testing
Who?	In-house development or QA team, customer	A group of real end users	Limited number of end users
What get?	Bugs, blockers, missing features and others	Ideas to improve usability, compatibility, functionality	Ideas for updates in upcoming versions
What next?	Beta testing	Gamma testing	Gold release/ final release

4. How many Bit in IPv4 & IPv6. Why NAT not need in IPv6?

Ans:

IPv4:

32 bits: IPv4 addresses are composed of 32 bits, typically represented as four decimal numbers separated by periods (e.g., 192.168.0.1).

IPv6:

46th BCS
Technical Cadre
Exam Taker: BPSC Exam Date: 20.08.2025
Exam Time: 4 Hours
Total marks: 200 Written (IT)

Subject Code (CSE-971)

1. (a) Mention two basic differences between 'call by value' and 'call by Reference'. Write a program in c/c++ Programming language to swap two integer values using 'call by Reference'.
(b) Consider the following code snippet in a C like Programming language-

```
int a = 5, b = 18, c = 27;
a = b++ + ++c;
b = a++ - c--;
c = a++ + b--;
```

What will be the output of a, b, and c after execution of the above statements? Explain your answer.
(c) What is polymorphism? Write a Java program to demonstrate the compile time and run time polymorphisms.
(d) What is Just In Time (JIT) compiler? How does it support machine independent programming?

Ans:
(a) Call by Value and Call by Reference:

Call by Value	Call by Reference
Passes a copy of the actual value to the function.	Passes the address/reference of the actual variable to the function.
Changes made inside the function do not affect the original variable.	Changes made inside the function directly affect the original variable.
Requires more memory (due to value copying).	Requires less memory (works on existing data).
Function works with simple data types.	Uses pointers (C/C++) or references (C++, Java, Python).
Actual and formal parameters are stored in different memory locations.	Actual and formal parameters share the same memory location.
Slightly slower due to copying overhead.	Generally faster, especially with large data

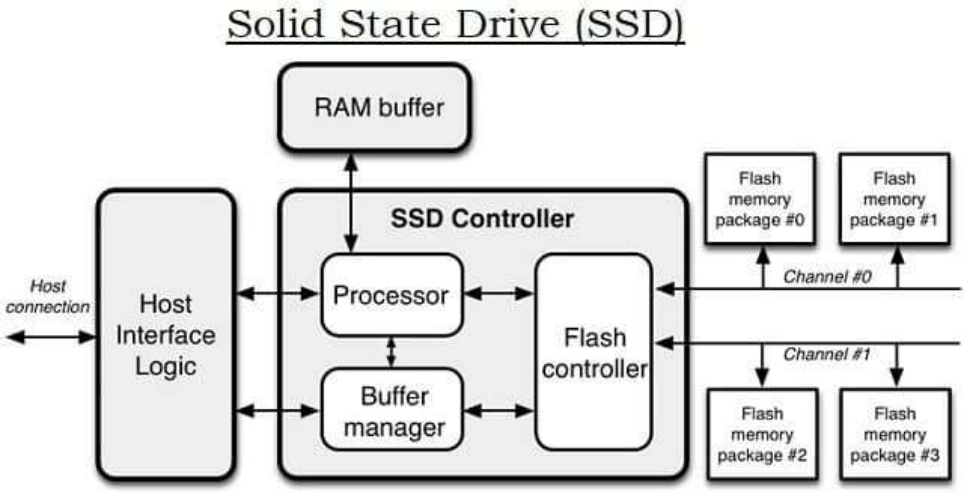
Ministry of Food
Network/Website Manager
Exam Taker: BPSC Exam Date: 21.05.2025
Exam Time: 4 Hours
Total marks: 200 Written (IT: 80, Non-IT: 120)

Subject Related (ICT)

1. a) Define the term SSD. Briefly describe the working principle of SSD.
b) Compare and contrast between CPU and GPU.

Ans:
(a) Solid-state drive (SSD):
It is a new generation of storage device used in computers. SSDs store data using flash-based memory, which is much faster than the traditional hard disks. SSDs also have no moving parts, and upgrading to one is a great way to speed up computer. SSDs connect to a computer using either SAS, SATA, or PCIe, depending on the type of SSD.

Working principle of SSD:
SSDs function through an arrangement of NAND flash memories. The more NAND flash memories in a unit, the more storage an SSD has and the faster its read and write speeds are.



A "channel" connects multiple flash memories to the controller. The controller handles data, transfer speeds, and data integrity and retention. Within the memory controller is a

That's the triangular series, which is O(n2)O(n2).

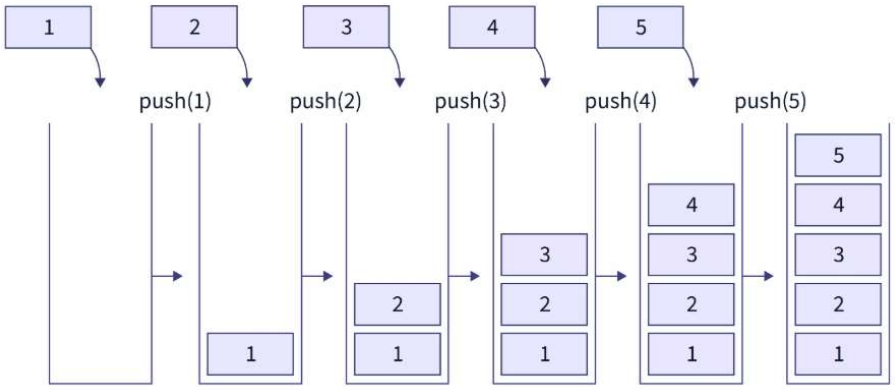
Selection sort doesn't rely on any extra arrays, so it's O(1) space.

- Worst-case complexity: $O(n^2)$
  When the input array is sorted in descending order. In this case, n-1 swaps are performed
- Best-case complexity: $O(n^2)$
  When the array is already sorted (ascending order). In this case, no swap operation is performed
- Average-case complexity: $O(n^2)$
  When the array is neither sorted in ascending nor in descending order

8. Explain the Push and Pop operations of the stack.

Ans:
A stack is a data structure which is used to store data in a linear fashion. It is an Abstract data type (ADT) in which data is inserted and deleted from a single end which is the stack's top. It follows a Last in, First out (LIFO) principle i.e. the data which is inserted most recently in the stack will be deleted first from the stack.

push()
Push is a function in stack definition which is used to insert data at the stack's top. When the stack is full, the overflow condition occurs.



The PUSH operation is broken down into the following steps:

- Before adding an element to a stack, we make sure it's not already full.

- This requires O(n) time to partition.

4. **Recursion**:
   - Recursively partition [2, 3, 4, 5].
   - Again, if the first element (2) is chosen as pivot, one partition will have [2] and the other [3, 4, 5].
   - This continues with each partitioning step taking O(n) time.
5. **Overall Time Complexity**:
   - Each partitioning step takes O(n) time, and if the partitioning consistently results in unbalanced partitions, the recurrence relation for time complexity T(n) = T(n-1) + O(n) results in O(n^2) time complexity in the worst case.

5. What is URI? Give an Example.

Ans:

URI stands for Uniform Resource Identifier. It's a string of characters used to identify a resource on the internet. Examples include:

```
https://www.example.com/index.html
ftp://username:password@ftp.example.com/file.txt
```

6. Write SQL Query For create, insert of a table
Emp (id, name, designation, Dept_name, Salary).
Write SQL Query that show department wise salary of Employee.

Ans:

```
CREATETABLE Emp (
     id INT PRIMARY KEY,
     name VARCHAR(100),
     designation VARCHAR(50),
     Dept_name VARCHAR(50),
     Salary DECIMAL(10, 2)
);

Insert data into Emp table
INSERTINTO Emp (id, name, designation, Dept_name, Salary)
VALUES
(1, 'John Doe', 'Manager', 'HR', 5000.00),
```