

Exam time will be 2 hours and written exam may be on 07.02.2025

Previous year 3 hours (1-hour MCQ + 2 hour Written)

Bangladesh Bank

Assistant programmer 2023

Exam Taker: BIBM Exam Time: 1+2 hour

Exam date: 3.2.2023

Exam type: 80 MCQ (1 Hour)

Written: 9 Subjective Question (150) +Math 4(20) +Focus (10) +B/E (20)

1. Consider a hash table of size 13 string entities with integer keys. Suppose the hash function is $h(k) = k \bmod 13$, insert in the given order, the keys 10,3,5,6,16,17,19 into the hash table using linear probing to resolve collisions. Show all the work.

<https://testbook.com/question-answer/consider-a-13-element-hash-table-for-which-key--6076d6b9271122ff0ea14bd5>

2. Give an adjacency-list representation for a complete binary tree on 7 vertices. Give an equivalent adjacency-matrix representation. Assume that vertices are numbered from 1 to 7 as in a binary heap.

<https://gateoverflow.in/309187/cormen-edition-3-exercise-22-1-question-2-page-no-592>

3. Given two integers, A and B as input. Write a program to compute LCM of A and B.

<https://www.geeksforgeeks.org/program-to-find-lcm-of-two-numbers/>

4. Write a SQL query return the number of movies which are romantic comedies. Suppose that we have a relational database with the following tables.

<https://www.coursehero.com/file/226212499/y2022PAPER3pdf/>

Table

| Primary Key

Movies (mid, title, year)	mid
People (pid, name)	pid
Genres (gid, genre)	gid
ActsIn (pid, mid)	pid, mid
HasRole (pid, mid, role)	pid, mid, role
HasGenre (gid, mid)	gid, mid

In tables ActsIn and HasRole, pid is a foreign key into people and mid is a foreign key into movies. In table HasGenre, mid is a foreign key into movies and gid is a foreign key into Genres.

5. Draw A Class Diagram. A token-ring based local-area-network (LAN) is a network consisting of nodes, in which network packets are sent around. Every node has a unique name within the network, and refers to its next node. Different kinds of nodes exist: workstations are originators of messages; servers and printers are network nodes that can receive messages. Packets contain an originator, a destination and content, and are sent around one a network. A LAN is a circular configuration of nodes.

<http://circle.visual-paradigm.com/token-ring-based-lan/>

6. Determine overloading method, overridden method and hide super class method?

https://dev.to/ravi_sarva/understanding-method-overriding-method-hiding-and-overloading-in-java-53o4

```
public class A{
    public void m1 () {}
    public void m2 () {}
    public void m3 (int i) {}
    public void m4 (string i) {}
}
public class B extends a{
    public static void m1 () {}
```

```
public void m2 () {}  
public void m3 (int i) {}  
public static void m4 (string i) {}  
}
```

7. Question about CIA.

In order to prevent that the company decided to add end to end encryption techniques which layer of the OSI model is suitable to work in considering parameters like development time, software maintainability and development cost, Give reasons for your concepts.

<https://testbook.com/question-answer/in-osi-model-which-layer-is-responsible-for-trans--629db49bf938d28833c3b146>

8. Describe a Man-in-middle attack on the Diffie-Hellman key exchange protocol in which the adversary generates two public key pairs for the attack.

<https://www.geeksforgeeks.org/man-in-the-middle-attack-in-diffie-hellman-key-exchange/>

10. Growing use to technology in the Financial Service Industry.

11. Translation English to Bangla.

Global economic turbulence is strongly felt in the banking and financial industry throughout the global. The visible transformations are taking place in terms of embracing the new recovery efforts by adopting newer technology. The business.

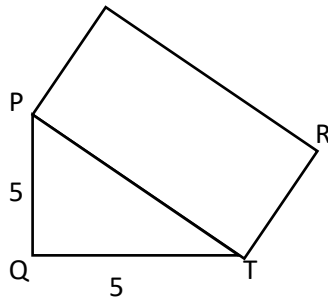
12. Translation Bangla to English.

13. If x is an Integer and $x+1/x=17/4$ then value of $x-1/x=?$

14. A basketball team has won 15 games and lost 9. If these games represent 163% 3% of the games to be played, then how many more games must the team win to average 75% for the season?

15. Students of a class are made to stand in rows. If students are extra in each row, then there would be 2 rows less. If four students are less in each row, then there would be 4 more rows. What is the number of students in the class?

16. Find the area of the following square PSRT.



Database Question Look like this:

You wish to query a database which is a subset of the IMDb Internet Movie Database. [Note: The first course practical used such a database.] Recall that the database schema has table movies with key movie_id, the table people with key person_id, and the table genres with key genre_id. The table has_genre implements a relationship between movies and genres and has the key (movie_id, genre_id). The table plays_role implements a relationship between movies and people and has the key (movie_id, person_id, role).

(a) Write an SQL query to return the number of movies that are romantic comedies.

```
SELECT COUNT(DISTINCT hg1.movie_id) AS romantic_comedy_count
FROM has_genre hg1
JOIN genres g1 ON hg1.genre_id = g1.genre_id
JOIN has_genre hg2 ON hg1.movie_id = hg2.movie_id
JOIN genres g2 ON hg2.genre_id = g2.genre_id
WHERE g1.genre_name = 'Romance' AND g2.genre_name = 'Comedy';
```

Explanation:

1. Tables Involved:

has_genre: Links movies to their genres via movie_id and genre_id.
--

genres: Contains the mapping of genre_id to genre names like "Romance" and "Comedy".
--

2. Joins:

The has_genre table is joined twice:

hg1 for filtering movies associated with the genre "Romance".

hg2 for filtering movies associated with the genre "Comedy".
--

Both are joined via the movie_id to ensure the movie has both genres.

3. Filtering:

The WHERE clause filters for g1.genre_name = 'Romance' and g2.genre_name = 'Comedy'.
--

4. Counting Unique Movies:

COUNT(DISTINCT hg1.movie_id) ensures that each movie is counted only once, even if it is linked to multiple other genres.

<https://bdquestionbank.com/bangladesh-bank-assistant-programmer-recruitment-exam-question-and-solution-2016/>