

11th Computer Science short question's answers According to
Smart Syllabus

COMPUTER SCIENCE

AND

ENTREPRENEURSHIP

11

Computer Science Department Government Islamia Graduate College Kasur

Chapter 1: Introduction to Software Development

1. Differentiate between functional and non-functional requirements.

Answer:

- **Functional requirements** describe what the system should do (specific behaviors, functions, tasks). Example: "User must be able to register an account."
 - **Non-functional requirements** describe how the system performs a function (quality attributes, constraints). Example: "System must handle 1000 simultaneous users."
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2. Explain why the testing phase is important in the Software Development Life Cycle (SDLC), and provide two reasons for its significance.

Answer:

Testing ensures software quality by identifying bugs and errors before deployment.

Two reasons:

1. It verifies that the software meets the specified requirements.
 2. It prevents costly failures and security breaches after release.
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3. Illustrate the concept of continuous integration in Agile Methodology and explain how it benefits software development.

Answer:

Continuous Integration (CI) is the practice of regularly merging code changes into a central repository, followed by automated builds and tests.

Benefits:

- Early detection of integration errors.
 - Reduces merge conflicts and speeds up development.
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4. Evaluate the main steps involved in risk assessment and management, and assess their importance in a software project.

Answer:

Steps:

1. **Identify risks** – technical, operational, external.
2. **Analyze risks** – likelihood and impact.
3. **Develop mitigation strategies** – avoid, transfer, reduce, accept.
4. **Monitor and review** – track risks throughout the project.

Importance: Prevents project failure, reduces unexpected costs, and ensures timely delivery.

7. Describe the Factory Pattern and explain how it differs from directly creating objects, with an example.

Answer:

The **Factory Pattern** provides an interface for creating objects without specifying the exact class of object that will be created.

Difference: Instead of using new directly, a factory method decides which class to instantiate.

Example: A Vehicle Factory creates either Car or Bike objects based on input, hiding the creation logic.

Chapter 2: Python Programming

1. Explain the purpose of using comments in Python code.

Answer:

Comments are non-executable lines used to explain code, improve readability, and document logic. They help developers understand and maintain the code.

2. Describe the difference between integer and float data types in Python. Provide an example of each.

Answer:

- **Integer (int):** whole numbers without a decimal point. Example: age = 17
 - **Float (float):** numbers with a decimal point. Example: price = 19.99
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3. Define operator precedence and give an example of an expression where operator precedence affects the result.

Answer:

Operator precedence determines the order in which operations are evaluated.

Example: $(3 + 4) * 2 = 14$ (parentheses first), while $3 + 4 * 2 = 11$ (multiplication first).

4. How does the short-hand if-else statement differ from the regular if-else statement?

Answer:

Short-hand if-else is a one-line conditional expression used for simple assignments. Regular if-else can contain multiple statements and blocks.

5. Explain how default parameters work in Python functions.

Answer:

Default parameters have a predefined value that is used if no argument is provided during the function call. Example: `def greet (name="Student"):` calling `greet ()` uses "Student".

6. Explain why modular programming is useful in Python.

Answer:

Modular programming divides a program into separate, reusable modules. It improves code organization, reusability, maintainability, and allows multiple developers to work on different parts independently.

Chapter 3: Algorithms and Problem Solving

1. Differentiate between well-defined and ill-defined problems within the realm of computational problem-solving.

Answer:

- **Well-defined:** clear goals, inputs, processes, and outputs (e.g., check if a number is even).
 - **Ill-defined:** ambiguous or vague goals and requirements (e.g., "reduce poverty").
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2. Outline the main steps involved in the Generate-and-Test method.

Answer:

1. Generate possible solutions.
 2. Test each solution against the problem constraints.
 3. If solution satisfies conditions, accept it.
 4. Otherwise, continue generating and testing until solution found or all options exhausted.
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3. Compare tractable and intractable problems in the context of computational complexity.

Answer:

- **Tractable:** solvable in polynomial time (P class) – efficient.
 - **Intractable:** require super-polynomial time (exponential) – impractical for large inputs.
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4. Summarize the key idea behind Greedy Algorithms.

Answer:

Greedy algorithms make the locally optimal choice at each step, hoping it leads to a global optimum. They are simple and fast but do not always guarantee the best solution.

5. Discuss the advantages of using Dynamic Programming.

Answer:

Dynamic Programming solves problems by breaking them into overlapping sub problems, storing results to avoid redundant calculations. It is efficient for optimization problems and reduces time complexity significantly.

6. Compare the advantages of Breadth-First Search (BFS) with Depth-First Search (DFS) in graph traversal.

Answer:

- **BFS:** finds shortest path in unweighted graphs, explores level by level. Good for shallow graphs.
 - **DFS:** uses less memory for deep graphs, can find solutions faster if goal is deep, useful for topological sorting and cycle detection.
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7. Explain the importance of breaking down a problem into smaller components in algorithmic thinking.

Answer:

Breaking down a problem simplifies complexity, makes it easier to design, test, and debug solutions. It also enables reuse of solutions for similar sub problems.

8. Identify the key factors used to evaluate the performance of an algorithm.

Answer:

- **Time complexity:** how runtime grows with input size.
 - **Space complexity:** how memory usage grows with input size.
 - **Scalability, accuracy, and resource consumption.**
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Chapter 4: Computational Structures

1. Explain how the insert () function works in Python lists. Provide an example.

Answer:

insert(index, item) adds an item at a specified position in the list. Elements after that index shift

right.

Example:

```
python
```

```
party_list = ["Buy drinks", "Buy decorations"]
```

```
party_list.insert(0, "Invite friends")
```

```
print(party_list) # ['Invite friends', 'Buy drinks', 'Buy decorations']
```

2. Explain the potential issues which could arise when two variables reference the same list in a program? Provide an example.

Answer:

If two variables refer to the same list, changes made through one variable affect the other, leading to unintended side effects.

Example:

```
python
```

```
a = [1, 2, 3]
```

```
b = a
```

```
b.append(4)
```

```
print(a) # [1, 2, 3, 4] (a is also changed)
```

3. Define a stack and explain the Last-In, First-Out (LIFO) principle.

Answer:

A stack is a data structure where insertion and deletion occur at the same end (top). **LIFO** means the last element added is the first one removed (like a stack of plates).

4. Differentiate between the Enqueue and Dequeue operations of queue.

Answer:

- **Enqueue:** Adds an element to the rear (back) of the queue.
 - **Dequeue:** Removes an element from the front of the queue.
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5. Name two basic operations performed on stack.

Answer:

- **Push:** Add an element to the top.
 - **Pop:** Remove the top element.
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6. What is the difference between enqueue() and dequeue()?

Answer:

enqueue() adds an item at the back of the queue; dequeue() removes and returns the item from the front of the queue. (Same as Q4)

Chapter 5: Data Analytics

1. List two types of data visualizations and describe when you would use each.

Answer:

- **Bar Chart:** Compare quantities across categories (e.g., sales per product).
 - **Line Graph:** Show trends over time (e.g., temperature changes).
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2. How does visualizing data help in understanding descriptive statistics?

Answer:

Visualizations like histograms and bar chart provide an intuitive view of data distribution, central tendency, spread, making statistical summaries easier to interpret.

Chapter 6: Emerging Technologies

1. What is edge computing and how does it benefit data processing?

Answer:

Edge computing processes data near the source (edge) instead of sending it to a centralized cloud. Benefits: reduced latency, faster real-time processing, bandwidth savings, and improved privacy.

2. Describe the concept of serverless architectures.

Answer:

Serverless architectures allow developers to run code without managing servers. Cloud providers automatically allocate resources and scale as needed. Developers pay only for actual execution time.

3. What advantages do Serverless architectures offer to developers?

Answer:

- No server management.
 - Automatic scaling.
 - Cost-effective (pay per use).
 - Faster deployment and focus on code.
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4. How does edge computing improve the efficiency of autonomous vehicles?

Answer:

Edge computing processes sensor and camera data locally inside the vehicle, enabling instant decisions (e.g., braking, steering) without waiting for cloud responses, thus improving safety and reaction time.

5. Differentiate between Elasticity and On-demand access in cloud computing.

Answer:

- **Elasticity:** Automatic scaling of resources up/down based on real-time demand.
 - **On-demand access:** Ability to provision resources instantly whenever needed, without manual intervention.
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Chapter 7: Legal and Ethical Aspects of Computing System

1. Why is it important for users to understand Terms of Use?

Answer:

Terms of Use define user rights, obligations, and legal safeguards. Understanding them helps users protect their privacy, avoid misuse, and know how to seek redress.

2. Differentiate between phishing and pharming.

Answer:

- **Phishing:** Fraudulent messages (emails, texts) trick users into revealing personal information.
 - **Pharming:** Redirects users from a legitimate website to a fake one without their knowledge, often by exploiting DNS or router vulnerabilities.
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3. What are the key steps involved in evaluating information sources?

Answer:

- Check the author's credentials and reputation.
 - Verify publication date and relevance.
 - Cross-check with other reliable sources.
 - Identify bias or agenda.
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4. How does responsible data sharing contribute to ethical use of information?

Answer:

Responsible data sharing ensures that personal information is shared only with trusted entities, with consent, and for legitimate purposes. It respects privacy, prevents misuse, and complies with data protection laws.

Chapter 8: Online Research and Digital Literacy

1. How can one ensure the reliability of information found online research?

Answer:

- Use credible sources (academic journals, government sites, recognized organizations).
 - Check author expertise and publication date.
 - Compare multiple sources.
 - Avoid biased or unverified content.
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2. Why is it important to evaluate the reliability of online sources?

Answer:

To avoid misinformation, ensure accuracy, and make informed decisions. Unreliable sources can lead to incorrect conclusions and harm.

3. Why is it important to use specific keywords when searching for information online?

Answer:

Specific keywords narrow down search results, reduce irrelevant information, and save time. They help search engines retrieve more precise and relevant content.

4. Describe the purpose of a trademark.

Answer:

A trademark is a sign, logo, or name that distinguishes goods/services of one business from others. It protects brand identity and prevents consumer confusion.

5. How does copyright differ from patent protection?

Answer:

- **Copyright** protects original literary and artistic works (books, music, software) automatically upon creation.
 - **Patent** protects inventions (processes, machines) and requires formal application and disclosure. Patents prevent others from making, using, or selling the invention.
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Chapter 9: Entrepreneurship in Digital Age

1. Define entrepreneurship in your own words.

Answer:

Entrepreneurship is the process of identifying a problem or opportunity, creating a business solution, and taking risks to build and grow a venture that delivers value.

2. What is the main focus of Design Thinking?

Answer:

Design Thinking is a human-centered approach that focuses on understanding user needs, defining problems clearly, ideating creative solutions, prototyping, and testing iteratively.

3. List the key steps involved in creating a business plan.**Answer:**

1. Executive Summary
 2. Business Description
 3. Market Analysis
 4. Products/Services
 5. Marketing and Sales Strategy
 6. Financial Plan
 7. Operational Plan
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4. Why is market research important for a new business?**Answer:**

Market research helps understand customer needs, competitor strengths/weaknesses, and market trends. It reduces risk, informs product development, and guides marketing strategies.

5. Explain the importance of a business pitch.**Answer:**

A business pitch communicates the core idea, value proposition, and market opportunity concisely to attract investors, partners, and customers. It turns ideas into support and funding.

6. How can storytelling benefit a business?**Answer:**

Storytelling creates emotional connections, makes complex ideas relatable, and helps customers remember the brand. It builds trust and differentiates the business in a crowded market.

7. Why is collaboration important in the entrepreneurial process?**Answer:**

Collaboration brings diverse skills, knowledge, and perspectives. It accelerates problem-solving, reduces individual workload, and leads to more innovative and refined solutions.