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Computer Science Grade 12 — Chapter 3

Programming Fundamentals

by Public Library

Independent practice MCQs from the supplied Class 12 Computer Science notes pack. Total: 50 questions.

A. Important / Main Topics

1. A programming paradigm is best defined as:

(A) A particular methodology to use a programming language for problem-solving
(B) A type of computer hardware
(C) A programming language
(D) A software application

Correct Answer: A

Explanation: A programming paradigm describes a process for creating and organizing code, acting as a particular methodology to use a language for problem-solving.

2. Which paradigm divides code into functions based on functionality?

(A) Object-Oriented Programming
(B) Functional Programming
(C) Procedural Programming
(D) Structural Programming

Correct Answer: B

Explanation: Functional programming divides code into functions based on functionality, focusing on what is to be achieved.

3. Which paradigm is based on data and objects that model real-world entities?

(A) Functional Programming
(B) Procedural Programming
(C) Object-Oriented Programming
(D) Structural Programming

Correct Answer: C

Explanation: OOP is based on data and objects, modeling real-world entities with attributes and methods.

4. In OOP, a class is best described as:

(A) An instance of an object
(B) A function in functional programming
(C) A type of data structure
(D) A template for creating objects

Correct Answer: D

Explanation: A class is an object creation template that specifies methods and attributes for its objects.

5. In OOP, an object is:

(A) An instance of a class
(B) A template for creating classes
(C) A function in functional programming
(D) A type of data structure

Correct Answer: A

Explanation: An object is an instance of a class that denotes a physical thing with distinct properties and behaviors.

6. Which OOP concept involves hiding data and combining it with methods?

(A) Abstraction
(B) Encapsulation
(C) Inheritance

(D) Polymorphism

Correct Answer: B

Explanation: Encapsulation — this correctly answers the question.

7. Which OOP concept simplifies complex scenarios by showing only necessary information?

(A) Encapsulation
(B) Inheritance
(C) Abstraction
(D) Polymorphism

Correct Answer: C

Explanation: Abstraction shows only essential information while hiding background details or implementation.

8. Which OOP concept allows a subclass to inherit attributes and methods from a parent class?

(A) Encapsulation
(B) Abstraction
(C) Polymorphism
(D) Inheritance

Correct Answer: D

Explanation: Inheritance allows a subclass to inherit attributes and methods from a parent class, reducing code repetition.

9. Which OOP concept allows objects of different classes to be treated as instances of a common type?

(A) Polymorphism
(B) Encapsulation
(C) Abstraction
(D) Inheritance

Correct Answer: A

Explanation: Polymorphism allows objects of different classes to be treated as instances of a common type.

10. A Python list is best described as:

(A) An immutable collection of items
(B) An ordered, mutable collection of items
(C) A type of function
(D) A type of loop

Correct Answer: B

Explanation: A Python list is best described as An ordered, mutable collection of items.

11. A Python tuple is best described as:

(A) A mutable list
(B) A type of dictionary
(C) An immutable list
(D) A type of function

Correct Answer: C

Explanation: A tuple is a special type of list that is immu.

12. A Python set is best described as:

(A) An ordered collection of items
(B) A type of dictionary
(C) A type of function
(D) A collection of unique and unordered elements

Correct Answer: D

Explanation: A set is a collection of unique and unordered elements; duplicates are automatically removed.

13. A Python dictionary is best described as:

(A) A collection of key-value pairs
(B) An ordered collection of items

(C) A collection of unique and unordered elements
(D) A type of function

Correct Answer: A

Explanation: A dictionary stores data as key-value pairs, where each key is unique and associated with a value.

14. Which function is used to add an element at the end of a Python list?

(A) `insert()`
(B) `append()`
(C) `remove()`
(D) `pop()`

Correct Answer: B

Explanation: `append()` — this correctly answers the question.

15. Which function is used to add an element at a specific position in a Python list?

(A) `append()`
(B) `remove()`
(C) `insert()`
(D) `pop()`

Correct Answer: C

Explanation: `insert()` — this correctly answers the question.

16. Why is updating code easier in functional programming?

(A) Because the code is shorter
(B) Because the code is written in Python
(C) Because there are no functions
(D) Because only the relevant function(s) need to be modified

Correct Answer: D

Explanation: Updating is easier because only the relevant function(s) need to be modified; the whole program does not need to be read again.

17. Which of the following is a disadvantage of functional programming?

(A) May involve overhead with large data structures
(B) Simpler code
(C) Easier to debug
(D) Functions are easier to test

Correct Answer: A

Explanation: Functional programming may involve overhead, especially when handling large data structures.

18. Which of the following is an advantage of OOP?

(A) It is always faster
(B) It simplifies complex systems by breaking them into reusable components
(C) It eliminates the need for functions
(D) It cannot model real-world objects

Correct Answer: B

Explanation: It simplifies complex systems by breaking them into reusable components — this correctly answers the question.

19. Which of the following is a disadvantage of OOP?

(A) It cannot model real-world objects
(B) It does not support encapsulation
(C) It may result in complex designs if not implemented thoughtfully
(D) It cannot use functions

Correct Answer: C

Explanation: It may result in complex designs if not implemented thoughtfully — this correctly answers the question.

20. In the bank example, which method retrieves the current balance without changing it?

(A) `deposit(amount)`
(B) `withdraw(amount)`
(C) `set_balance()`
(D) `get_balance()`

Correct Answer: D

Explanation: `get_balance()` — this correctly answers the question.

21. Which OOP concept is illustrated by a 'Car' inheriting attributes from a 'Vehicle'?

(A) Inheritance
(B) Encapsulation
(C) Abstraction
(D) Polymorphism

Correct Answer: A

Explanation: A 'Car' inheriting from a 'Vehicle' illustrates inheritance.

22. Which OOP concept is illustrated by different shapes having their own `calculateArea()` method?

(A) Encapsulation
(B) Polymorphism
(C) Abstraction
(D) Inheritance

Correct Answer: B

Explanation: Polymorphism — this correctly answers the question.

23. What happens if you try to remove a value that is not in a Python list?

(A) Nothing happens
(B) The list is cleared
(C) A `ValueError` is raised
(D) The program crashes silently

Correct Answer: C

Explanation: Trying to remove a value that is not in the list raises a `ValueError`.

24. What is the index of the first element in a Python list?

(A) 1
(B) -1
(C) Depends on the list
(D) 0

Correct Answer: D

Explanation: In Python, indexing starts at 0, so the first element is at index 0.

25. Which of the following is true about Python lists?

(A) They can store different data types
(B) They can only store integers
(C) They have a fixed size
(D) They cannot be changed after creation

Correct Answer: A

Explanation: Python lists can store different data types and are mu.

B. Less Important / Secondary Topics

26. Why is it good practice to use a conditional statement before removing a value from a list?

(A) To prevent a `ValueError` if the value is not in the list
(B) To make the code run faster
(C) To add a new value
(D) To sort the list

Correct Answer: A

Explanation: To prevent a `ValueError` if the value is not in the list — this correctly answers the question.

27. How do you calculate the average of a list of numbers in Python without using a loop?

(A) Using `average()` function
(B) Using `sum()` and `len()`
(C) Using `mean()` function
(D) Using `avg()` function

Correct Answer: B

Explanation: The average is calculated using `sum(list) / len(list)`.

28. What is a tuple in Python?

(A) A mutable list
(B) A type of dictionary
(C) An immutable list
(D) A type of function

Correct Answer: C

Explanation: A tuple is a special type of list in Python that is immu.

29. How is a tuple created in Python?

(A) Using square brackets `[]`
(B) Using curly braces `{}`
(C) Using angle brackets `<>`
(D) Using parentheses `()`

Correct Answer: D

Explanation: Tuples are created using parentheses `()`.

30. Can you add an element to a tuple after it is created?

(A) No, tuples are immutable
(B) Yes, using `append()`
(C) Yes, using `insert()`
(D) Yes, using `add()`

Correct Answer: A

Explanation: No, tuples are immutable — this correctly answers the question.

31. How do you access the first element of a tuple named `grades`?

(A) `grades[1]`
(B) `grades[0]`
(C) `grades.first()`
(D) `grades.get(0)`

Correct Answer: B

Explanation: Indexing starts at 0, so the first element is `grades[0]`.

32. Which operator is used to check if a value exists in a tuple?

(A) `==`
(B) `exists`
(C) `in`
(D) `contains`

Correct Answer: C

Explanation: `in` — this correctly answers the question.

33. What does `grades.count(92)` return if `92` appears twice in the tuple?

(A) 1
(B) 3
(C) 0
(D) 2

Correct Answer: D

Explanation: 2 — this correctly answers the question.

34. What happens when you concatenate two tuples using `+`?

(A) A new tuple is created
(B) The first tuple is modified
(C) The second tuple is modified
(D) The tuples are merged into a list

Correct Answer: A

Explanation: Concatenation creates a new tuple; the original tuples are not modified.

35. Which of the following is a valid single-element tuple?

(A) `(5)`
(B) `(5,)`
(C) `[5]`
(D) `{5}`

Correct Answer: B

Explanation: `(5,)` — this correctly answers the question.

36. A student writes a function that works for normal inputs but fails for an empty list. Which programming construct would help catch this issue early?

(A) A `while` loop
(B) An `if` statement
(C) A unit test with an edge case
(D) A `print()` statement

Correct Answer: C

Explanation: Unit tests with edge cases (like an empty list) catch bugs early, ensuring the function works for all valid inputs.

37. A programmer wants to store a student's name, registration number, and marks in a single structure, with the ability to look up the record by name. Which Python construct is most suitable?

(A) A list of integers
(B) A tuple of strings
(C) A set of names
(D) A dictionary with the name as the key and a list of details as the value

Correct Answer: D

Explanation: A dictionary allows lookup by key (name), and a list as the value allows storing multiple details per student.

38. A programmer needs to store a fixed set of values that must not change during program execution, such as the days of the week. Which Python construct is most suitable?

(A) Tuple
(B) List
(C) Set
(D) Dictionary

Correct Answer: A

Explanation: Tuple — this correctly answers the question.

39. A programmer needs to remove all duplicate values from a list. Which Python construct is most suitable?

(A) Tuple
(B) Set
(C) Dictionary
(D) Stack

Correct Answer: B

Explanation: A set automatically removes duplicates, making it ideal for removing duplicate values.

40. A student writes a class `Rectangle` with private attributes and methods to calculate area and perimeter. Which OOP principle is being applied?

(A) Inheritance
(B) Polymorphism
(C) Encapsulation
(D) Abstraction

Correct Answer: C

Explanation: Encapsulation hides data and combines it with methods, as seen in the `Rectangle` class with private attributes.

41. A program defines a base class `Vehicle` and derived classes `Car` and `Bike`, each with its own `start()` method. Which OOP principle is being applied?

(A) Encapsulation
(B) Abstraction
(C) Inheritance
(D) Polymorphism

Correct Answer: D

Explanation: Polymorphism allows different classes (`Car`, `Bike`) to be treated as instances of a common type (`Vehicle`) with their own implementations.

42. Which of the following best explains why functional programming naturally supports parallel and concurrent programming?

(A) Because functions are independent and can be executed simultaneously
(B) Because functions are always fast
(C) Because functions do not use data
(D) Because functions are written in Python

Correct Answer: A

Explanation: In functional programming, functions are independent and can be executed simultaneously, supporting parallel and concurrent programming.

43. A student writes a function that calculates the factorial of a number using recursion. Which paradigm does this best align with?

(A) Object-Oriented Programming
(B) Functional Programming
(C) Procedural Programming
(D) Structural Programming

Correct Answer: B

Explanation: Recursive functions are a common feature of functional programming, where the solution is expressed as a series of function calls.

44. A programmer needs to store a list of unique usernames and quickly check if a username already exists. Which Python construct is most suitable?

(A) List
(B) Tuple
(C) Set
(D) Dictionary

Correct Answer: C

Explanation: A set stores unique values and provides fast membership testing, making it ideal for checking if a username exists.

45. A programmer wants to store a matrix (2D grid of numbers) in Python. Which construct is most suitable?

(A) A flat list
(B) A tuple
(C) A set

(D) A nested list

Correct Answer: D

Explanation: A nested list (list of lists) can represent a 2D matrix, with rows and columns accessible by indexes.

46. A programmer needs to store a dictionary where each key (student name) maps to multiple values (marks in different subjects). Which construct is most suitable?

(A) A dictionary with lists as values
(B) A list of tuples
(C) A set of strings
(D) A flat dictionary with single values

Correct Answer: A

Explanation: A dictionary with lists as values allows multiple pieces of data to be stored under a single key, such as marks in different subjects per student.

47. A student wants to count how many times the letter 'a' appears in a string. Which approach is most suitable?

(A) Using a `while` loop
(B) Using a `for` loop and a counter
(C) Using a recursive function
(D) Using a `print()` statement

Correct Answer: B

Explanation: Iterating through each character with a `for` loop and incrementing a counter is the simplest approach.

48. A programmer is designing a system where multiple objects of different types (e.g., `Circle`, `Rectangle`) must respond to a common operation (e.g., `draw()`). Which OOP principle is most relevant?

(A) Encapsulation
(B) Abstraction
(C) Polymorphism
(D) Inheritance

Correct Answer: C

Explanation: Polymorphism allows different objects to be treated as instances of a common type and respond to the same operation in their own way.

49. A programmer wants to store data in a file so that it persists after the program ends. Which Python construct is most suitable?

(A) A list
(B) A tuple
(C) A set
(D) A file (using `open()` and `write()`)

Correct Answer: D

Explanation: A file (using `open()` and `write()`) — this correctly answers the question.

50. A programmer wants to store a list of student records with fields like name, roll number, and marks, and perform operations like adding, removing, and searching records. Which Python construct is most suitable?

(A) A list of dictionaries
(B) A tuple of strings
(C) A set of integers
(D) A single dictionary with one key

Correct Answer: A

Explanation: A list of dictionaries allows each record to be a dictionary with key-value pairs (name, roll number, marks), with the list allowing multiple records.