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Week 1: Assignment 1

The due date for submitting this assignment has passed.

Due on 2025-02-05, 23:59 IST.

Assignment submitted on 2025-02-01, 16:27 IST

1) Which of the following OOP principles ensures that a derived class can modify behavior inherited from a base class? ***1 point***

- Inheritance
- Abstraction
- Encapsulation

Polymorphism

Yes, the answer is correct.
Score: 1

Accepted Answers:
Polymorphism

2) Which of the following is not a characteristic of object-oriented programming? ***1 point***

- Encapsulation
- Polymorphism
- Functional composition
- Inheritance

Yes, the answer is correct.
Score: 1

Accepted Answers:
Functional composition

3) If a class is considered a “set” in mathematical terms, which of the following could be considered as objects? ***1 point***

- Functions defined on the set
- Elements of the set
- Subsets of the set
- Realized instances of the set (e.g., empty set)

No, the answer is incorrect.
Score: 0

Accepted Answers:
Realized instances of the set (e.g., empty set)

4) Encapsulation can be mathematically represented as: ***1 point***

- $f : X \to Y$ where X and Y represent private and public data, respectively.
- $f : A \to A$ where f is identity over the class.

- $X = Y$ implying data and methods are the same.
- $f : X \to X$ where f is a structure-preserving map over private data.

Yes, the answer is correct.
Score: 1

Accepted Answers:
$f : X \to Y$ *where* X *and* Y *represent private and public data, respectively.*

5) Which of the following best describes polymorphism in a mathematical sense? ***1 point***

- Multiple functions $f_1 : A \to B$, $f_2 : C \to D$, etc., with the same name but possibly independent input-output types.
- A single function f defined as $f : A \to B$ and $f : C \to D$, operating across different domains and codomains.
- A function $f : A \to A$ that maps elements within the same domain and codomain.
- A composite function $f \circ g : X \to Y$, where$g : X \to Z$ and $f : Z \to Y$, used to chain operations.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Multiple functions $f_1 : A \to B$, $f_2 : C \to D$, *etc., with the same name but possibly independent input-output types.*

6) Inheritance in OOP is most analogous to: ***1 point***

- Set theory: Subsets inheriting properties of supersets.
- Group theory: Groups inheriting properties of subgroups.
- Graph theory: Nodes inheriting edges.
- Linear algebra: Matrices inheriting vector spaces.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Set theory: Subsets inheriting properties of supersets.

7) Which of the following best encapsulates the core purpose of object-oriented programming? ***1 point***

- (selected) Maximizing code reuse and scalability.
- Simplifying logical flow in functional applications.
- Optimizing mathematical operations on datasets.
- Ensuring type safety at runtime.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Maximizing code reuse and scalability.

8) In an object-oriented system, relationships between objects are best modeled as: ***1 point***

- (selected) Directed graphs
- Bipartite graphs
- Sets with cardinality constraints
- Undirected graphs

Yes, the answer is correct.
Score: 1

Accepted Answers:
Directed graphs

9) Which of the following best explains the idea of abstraction in OOP? ***1 point***

- (selected) Hiding unnecessary details and showing only the relevant features.
- A mapping between two completely unrelated concepts.
- Defining all possible implementations explicitly in a class.
- Combining unrelated objects into a single type.

Yes, the answer is correct.
Score: 1

Accepted Answers:
Hiding unnecessary details and showing only the relevant features.

10) Polymorphism in OOP is analogous to which of the following concepts? ***1 point***

- (●) A function that behaves differently depending on the input.
- ( ) Using the same name for multiple variables in a program.
- ( ) A method that only works with one specific type of data.
- ( ) Changing the internal logic of a program without altering its behavior.

Yes, the answer is correct.
Score: 1

Accepted Answers:
A function that behaves differently depending on the input.