by Kunal Sir

Assignment : Polymorphism (Narrowing Concept)

Part A : MCQs

MCQ 1

What is the narrowing concept in polymorphism mainly related to?
A. Method overriding
B. Method overloading resolution
C. Type casting
D. Interfaces

MCQ 2

Why does Java call the child-type method in narrowing?
A. Child class has more methods
B. Child type is more specific
C. Parent methods are ignored
D. Due to inheritance only

MCQ 3

What will be the output?

```
class A {
    void m1(Object o) { System.out.println("Object"); }
    void m1(String s) { System.out.println("String"); }
}
public class Test {
    public static void main(String[] args) {
        new A().m1(null);
    }
}
```

A. Object
B. String
C. Compilation error
D. Runtime error

MCQ 4

Which condition is mandatory for narrowing to occur?
A. Same return type
B. Same method body
C. Parent-child relationship between parameters
D. Use of casting

MCQ 5

What happens if two overloaded methods have unrelated parameter types and `null` is passed?
A. Child method is called
B. Parent method is called
C. Compilation error
D. Runtime exception

MCQ 6

Which of the following best describes narrowing?
A. JVM behavior at runtime
B. Compiler-time decision
C. Memory optimization technique
D. Exception handling mechanism

MCQ 7

Which of the following arguments most commonly demonstrates narrowing?
A. int value
B. String literal
C. null
D. boolean value

MCQ 8

If method parameters are `A` and `Object`, which one will be chosen?
A. Object
B. A
C. Randomly chosen
D. Causes error

MCQ 9

Does narrowing depend on reference type or object type?
A. Object type
B. Reference type
C. Both
D. None

MCQ 10

Which concept is MOST confused with narrowing?
A. Abstraction
B. Downcasting
C. Encapsulation
D. Multithreading

Part B : Problem Statements

Problem 1: Notification System

```
class Notification {
    void send(Object msg) {
        System.out.println("Generic Notification");
    }
    void send(String msg) {
        System.out.println("Text Notification");
    }
}
public class Test {
    public static void main(String[] args) {
        Notification n = new Notification();
        n.send(null);
    }
}
```

Task: Write the output and justify the answer using narrowing concept.

Problem 2: Payment Processing

```
class Payment {
    void process(Object o) {
        System.out.println("Processing Payment");
    }
    void process(String mode) {
        System.out.println("Processing Payment Mode");
    }
}
public class Test {
    public static void main(String[] args) {
        new Payment().process(null);
    }
}
```

Task: Write the output and explain why that method is selected.

Problem 3: Customer Support System

```
class Support {
    void help(Object o) {
        System.out.println("General Support");
    }
    void help(String issue) {
        System.out.println("Issue-Based Support");
    }
}
public class Test {
    public static void main(String[] args) {
        Support s = new Support();
        s.help(null);
    }
}
```

Task: Write the output and identify the narrowed parameter.

Problem 4: Banking Application

```
class Bank {
    void openAccount(Object o) {
        System.out.println("Opening Generic Account");
    }
    void openAccount(String type) {
        System.out.println("Opening Savings Account");
    }
}
public class Test {
    public static void main(String[] args) {
        new Bank().openAccount(null);
    }
}
```

Task: Predict the output and explain the compiler decision.

Problem 5: E-Commerce Order System

```
class Order {
    void place(Object o) {
        System.out.println("Placing Order");
    }
    void place(String product) {
        System.out.println("Placing Product Order");
    }
}
public class Test {
    public static void main(String[] args) {
        Order o = new Order();
        o.place(null);
    }
}
```

Task: Write the output and explain the narrowing rule applied.

Problem 6: Hospital Management

```
class Hospital {
    void admit(Object o) {
        System.out.println("General Admission");
    }
    void admit(String patient) {
        System.out.println("Patient Admission");
    }
}
public class Test {
    public static void main(String[] args) {
        new Hospital().admit(null);
    }
}
```

Task: Write the output and explain why no ambiguity occurs.

Problem 7: Transport Booking

```
class Transport {
    void book(Object o) {
        System.out.println("Booking Transport");
    }
    void book(String vehicle) {
        System.out.println("Booking Vehicle");
    }
}
public class Test {
    public static void main(String[] args) {
        Transport t = new Transport();
        t.book(null);
    }
}
```

Task: Identify the output and justify using narrowing.

Problem 8: Online Learning Platform

```
class Course {
    void enroll(Object o) {
        System.out.println("General Enrollment");
    }
    void enroll(String courseName) {
        System.out.println("Course Enrollment");
    }
}
public class Test {
    public static void main(String[] args) {
        new Course().enroll(null);
    }
}
```

Task: Write the output and explain the specificity rule.

Problem 9: Social Media App

```
class Post {
    void share(Object o) {
        System.out.println("Sharing Content");
    }
    void share(String text) {
        System.out.println("Sharing Text Post");
    }
}
public class Test {
    public static void main(String[] args) {
        Post p = new Post();
        p.share(null);
    }
}
```

Task: Write the output and explain method selection.

Problem 10: Travel Booking System

```
class Travel {
    void book(Object o) {
        System.out.println("Booking Travel");
    }
    void book(String destination) {
        System.out.println("Booking Destination");
    }
}
public class Test {
    public static void main(String[] args) {
        new Travel().book(null);
    }
}
```

Task: Write the output and justify using narrowing concept.

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