Appendix E

Mock Exam: Java SE 17 Developer

This is a mock exam for the *Java SE 17 Developer* exam. It comprises brand-new questions, which are similar to the questions that can be expected on the real exam. Working through this exam will give a good indication of how well you are prepared for the real exam, and whether any topics need further study.

Considering the vast number of Java topics in the exam objectives and only 50 multiple-choice questions on the exam, this mock exam contains questions on a selected number of topics, as on the real exam.

Annotated answers to the questions can be found in **Appendix F**, **p. 1737**.

Questions

Q1 What will be printed when the following program is run?

Click here to view code image

```
class Base {
  protected int i;
  Base() { add(1); }
  void add(int v) { i += v; }
  void print() { System.out.println(i); }
}

class Extension extends Base {
  Extension() { add(2); }
  void add(int v) { i += v*2; }
}

public class Qd073 {
  public static void main(String[] args) {
    bogo(new Extension());
  }

  static void bogo(Base b) {
    b.add(8);
    b.print();
```

```
  }
}
```

Select the one correct answer.

a. `9`

b. `11`

c. `13`

d. `21`

e. `22`

Q2 What will be printed when the following program is executed?

Click here to view code image

```
public class Qcb90 {
  private int a;
  private int b;
  public void f() {
    a = 0;
    b = 0;
    int[] c = { 0 };
    g(b, c);
    System.out.println(a + " " + b + " " + c[0] + " ");
  }

  public void g(int b, int[] c) {
    a = 1;
    b = 1;
    c[0] = 1;
  }

  public static void main(String[] args) {
    Qcb90 obj = new Qcb90();
    obj.f();
  }
}
```

Select the one correct answer.

a. `0 0 0`

b. `0 0 1`

c. `0 1 0`

d. `1 0 0`

e. `1 0 1`

Q3 Given the following interface declaration, which declaration is valid?

```
interface I {
  void setValue(int val);
  int getValue();
}
```

Select the one correct answer.

Click here to view code image

a.

```
class A extends I {
  int value;
  void setValue(int val) { value = val; }
  int getValue() { return value; }
}
```

b.

```
interface B extends I {
  void increment();
}
```

c.

Click here to view code image

```
abstract class C implements I {
  int getValue() { return 0; }
  abstract void increment();
}
```

d.

```
interface D implements I {
  void increment();
}
```

e.

Click here to view code image

```
class E implements I {
  int value;
  public void setValue(int val) { value = val; }
}
```

Q4 What will be the result of compiling and running the following program?

Click here to view code image

```
public class Q200A80 {
  public static void main(String[] args) {
    callType(10);
  }

  private static void callType(Number num){
    System.out.println("Number passed");
  }

  private static void callType(Object obj){
    System.out.println("Object passed");
  }
}
```

Select the one correct answer.

a. The program will compile and will print `Object passed`.

b. The program will compile and will print `Number passed`.

c. The program will fail to compile, because the call to the `callType()` method is ambiguous.

d. The program will compile, but it will throw a `ClassCastException` at runtime.

Q5 Given the following code:

Click here to view code image

```
class MyClass {
  public static void main(String[] args) {
    int k = 0;
    int l = 0;
    for (int i = 0; i <= 3; i++) {
      k++;
      if (i == 2) break;
      l++;
    }
    System.out.println(k + ", " + l);
  }
}
```

Which of the following statements is true?

Select the one correct answer.

a. The program will fail to compile.

b. The program will print `3, 3` at runtime.

c. The program will print `4, 3` at runtime if the `break` statement is replaced by the `continue` statement.

d. The program will fail to compile if the `break` statement is replaced by the `return` statement.

e. The program will fail to compile if the `break` statement is replaced by an empty statement.

Q6 Given the declaration:

Click here to view code image

```
int[][] nums = {{20}, {30}, {40}};
```

Which code will compile and print `90` at runtime?

Select the one correct answer.

Click here to view code image

a.

```
{
  int sum = 0;
  for (int[] row : nums[])
    for (int val : nums[row])
      sum += val;
  System.out.println(sum);
}
```

b.

Click here to view code image

```
{
  int sum = 0;
  for (int[] row : nums[][])
    for (int val : nums[row])
      sum += val;
  System.out.println(sum);
}
```

c.

Click here to view code image

```
{
  int sum = 0;
  for (int[] row : nums)
    for (int val : nums[row])
      sum += val;
  System.out.println(sum);
}
```

d.

Click here to view code image

```
{
  int sum = 0;
  for (int[] row : nums)
```

```
    for (int val : row)
      sum += val;
  System.out.println(sum);
}
```

e.

Click here to view code image

```
{
  int sum = 0;
  for (Integer[] row : nums)
    for (int val : row)
      sum += val;
  System.out.println(sum);
}
```

Q7 What will be the result from running the following program?

Click here to view code image

```
public class Q1408b {
  public static void main(String[] args) {
    int i = 0;
    while (++i == i) {
      System.out.println(i++);
    }
  }
}
```

Select the one correct answer.

a. The program will execute and terminate normally, but it will not print anything.

b. The program will execute indefinitely, printing all numbers from 1 onward.

c. The program will execute indefinitely, printing all numbers from 2 onward.

d. The program will execute indefinitely, printing all even numbers from 2 onward.

e. The program will execute indefinitely, printing all odd numbers from 1 onward.

f. The program will execute indefinitely, printing all odd numbers from 3 onward.

Q8 What will be the result from running the following program?

Click here to view code image

```
public class RemainderFun {
  public static void main(String[] args) {
    int i = 24, k = 7;
    System.out.print( i %  k + "|");
    System.out.print( i % -k + "|");
    System.out.print(-i %  k + "|");
    System.out.println(-i % -k);
  }
}
```

Select the one correct answer.

a. The program will fail to compile.

b. The program will compile, but it will throw an exception at runtime.

c. `3|-3|-3|3`

d. `3|3|-3|-3`

e. `3|-3|-3|-3`

f. `3|-3|3|-3`

Q9 Which statement is true about the following program?

Click here to view code image

```
public class Switchy {
  public static void main(String[] args) {
    final String s1 = "January";
    final String yr = " 2022";
    s1.concat(yr);
    switch (s1) {
      default -> System.out.println("Sorry.");
      case "January" + yr, s1 + " 2023" -> System.out.println("OK.");
    }
  }
}
```

Select the one correct answer.

a. The program will fail to compile.

b. The program will compile. When run, it will print: `Sorry. OK`.

c. The program will compile. When run, it will print: `Sorry`.

d. The program will compile. When run, it will print: `OK.`

Q10 What will be the result from the following program?

Click here to view code image

```
public class CodeMe {
  public static void main(String[] args) {
    boolean flag = false;
    if (false)          // (1)
      flag = !flag;
    System.out.println(flag);
  }
}
```

Select the two correct answers.

a. The program, as it stands, does not compile.

b. The program will compile without errors. When run, it will print `false`.

c. The program will compile without errors. When run, it will print `true`.

d. If the keyword `if` at (1) is replaced with the keyword `while`, the program will compile without errors. When run, it will print `false`.

e. If the keyword `if` at (1) is replaced with the keyword `while`, the program will compile without errors. When run, it will print `true`.

f. If the keyword `if` at (1) is replaced with the keyword `while`, the program will fail to compile.

Q11 What will be the result from the following program?

Click here to view code image

```
import java.util.List;

class Person implements Comparable<Person> {
  public int compareTo(Person p) {
    return 1;
  }
}

class Student extends Person {
  public int compareTo(Student s) {
    return 2;
  }
}

public class Calling {
  public static void main(String[] args) {
    Person  p1 = new Person();
    Student s1 = new Student();
    Student s2 = new Student();
    Person  p2 = s1;
    System.out.println(List.of(
        p1.compareTo(s1), p1.compareTo(p2),
        p2.compareTo(s1), p2.compareTo(p1),
        s1.compareTo(p1), s1.compareTo(p2),
        s1.compareTo(s2)));
  }
}
```

Select the one correct answer.

a. `[1, 1, 2, 1, 1, 1, 2]`

b. `[1, 1, 1, 1, 1, 1, 2]`

c. `[1, 1, 2, 1, 1, 2, 2]`

d. `[1, 1, 1, 1, 1, 2, 2]`

e. `[1, 1, 1, 1, 2, 2, 2]`

Q12 What will be the result of compiling and running the following program?

Click here to view code image

```
import java.util.ArrayList;
import java.util.List;

public class Q12A56 {
  public static void main(String[] args) {
    List<String> strList = new ArrayList<>();
    strList.add(0, "Ada");
    strList.add("Alyla");
    strList.set(strList.size()-1, "Otto");
    strList.add(strList.size()-1, "Anna");
    System.out.println(strList);                        // (1)
    int size = strList.size();
    for (int i = 0; i < size; ++i) {
      strList.add(strList.get(size-1-i));
    }
    System.out.println(strList);                        // (2)
  }
}
```

Select the two correct answers.

a. (1) will print `[Ada, Alyla, Anna]`.

b. (1) will print `[Ada, Anna, Otto]`.

c. (1) will print `[Ada, Otto, Alyla]`.

d. (2) will print `[Ada, Alyla, Anna, Anna, Alyla, Ada]`.

e. (2) will print `[Ada, Anna, Otto, Otto, Anna, Ada]`.

f. (2) will print `[Ada, Otto, Alyla, Alyla, Otto, Ada]`.

Q13 What will be the result of compiling and running the following program?

Click here to view code image

```
import java.util.ArrayList;
import java.util.List;

public class Q12A55 {
  public static void main(String[] args) {
    List<String> strList = new ArrayList<>();
    strList.add(strList.size(), "Anna");
    strList.add(strList.size()-1, "Ada");
```

```
    strList.add(strList.size()-1, "Otto");
    strList.add(0, "Alyla");
    System.out.println(strList);
    int size = strList.size();
    for (int i = 0; i < size/2; ++i) {
      String strTemp = strList.get(i);
      strList.set(i, strList.get(size-1-i));
      strList.set(size-1-i, strTemp);
    }
    System.out.println(strList);
  }
}
```

Select the one correct answer.

a. The program will fail to compile.

b. The program will throw an `IndexOutOfBoundsException`.

c. The program will throw a `NullPointerException`.

d. The program will print:

```
[Alyla, Ada, Otto, Anna]
[Anna, Otto, Ada, Alyla]
```

e. The program will print:

```
[Ada, Otto, Alyla, Anna]
[Anna, Alyla, Otto, Ada]
```

Q14 Given the following code:

Click here to view code image

```
import java.util.function.Predicate;
public class Test {
  public static void main(String[] args) throws IOException  {

    Stream<String> shapes = Stream.of("Circle","Cube");
    // (1) INSERT CODE HERE
    shapes.filter(p).forEach(v->System.out.println(v));
```

```
  }
}
```

Which code option can be inserted at (1) so that the program prints `"Circle"` and `"Cube"`?

Select the one correct answer.

a.

Click here to view code image

```
Predicate<String> p = s -> {
  s.toLowerCase();
  return s.contains("c");
    };
```

b.

Click here to view code image

```
Predicate p = s -> {
  s = s.toString().toLowerCase();
  return s.contains("c");
    };
```

c. `Predicate<String> p = s -> s.contains("c");`

d. `Predicate<Object> p = s -> s.toString().toLowerCase().contains("c");`

e. `Predicate p = s -> s.contains("c");`

f. `Predicate p = s -> s.toLowerCase().contains("c");`

Q15 Which statement is true about the following interfaces?

Click here to view code image

```
interface IA            { boolean equals(Object obj); }
interface IB extends IA { boolean doIt(String str); }
interface IC extends IB { boolean doIt(String str); }
interface ID extends IC { boolean equals(Object obj);}
```

Select the one correct answer.

a. `IA` is a functional interface.

b. `IB` is a functional interface.

c. `IC` is not a functional interface.

d. `ID` is not a functional interface.

Q16 What will be the result of compiling and running the following program?

Click here to view code image

```
import java.time.LocalDate;

public class Q11A35 {
  public static void main(String[] args) {
    LocalDate date = LocalDate.of(2015, 1, 1);
    date.withYear(5);
    System.out.println(date.plusMonths(12));
  }
}
```

Select the one correct answer.

a. The program will fail to compile.

b. The program will throw an exception at runtime.

c. The program will print `0006-01-01`.

d. The program will print `2021-01-01`.

e. The program will print `2015-01-01`.

f. The program will print `2016-01-01`.

Q17 Which code, when inserted at (1), will make the program compile and execute normally?

Click here to view code image

```
import java.time.*;
import java.time.format.*;

public class Q11A95 {
  public static void main(String[] args) {
    String inputStr = "The time is 15 minutes past 10PM.";
    String pattern = "'The time is 'm' minutes past 'ha.";
    DateTimeFormatter dtf = DateTimeFormatter.ofPattern(pattern);
    // (1) INSERT CODE HERE
  }
}
```

Select the three correct answers.

a. `LocalTime time = LocalTime.parse(inputStr, dtf);`

b. `LocalDate date = LocalDate.parse(inputStr, dtf);`

c. `LocalDateTime dateTime = LocalDateTime.parse(inputStr, dtf);`

d. `String timeStr = LocalTime.of(9, 20).format(dtf);`

e. `String dateStr = LocalDate.of(2015, 12, 24).format(dtf);`

f. `String dateTimeStr = LocalDateTime.of(2015, 12, 24, 22, 15).format(dtf);`

Q18 Given that a static method `doIt()` in the class `Work` represents work to be done, which lines of code will succeed in starting a new thread that will do the work?

Select the one correct answer.

a.

Click here to view code image

```
Runnable r = new Runnable() {
  public void run() {
    Work.doIt();
  }
};
```

```
Thread t = new Thread(r);
   t.start();
```

b.

Click here to view code image

```
Thread t = new Thread() {
  public void start() {
    Work.doIt();
  }
};
t.start();
```

c.

Click here to view code image

```
Runnable r = new Runnable() {
  public void run() {
    Work.doIt();
  }
};
r.start();
```

d.

Click here to view code image

```
Thread t = new Thread(new Work());
t.start();
```

e.

Click here to view code image

```
Runnable t = new Runnable() {
  public void run() {
    Work.doIt();
  }
};
t.run();
```

Q19 Which of the following statements are true about the following program?

Click here to view code image

```
public class Q100A82 {
  public static void main(String[] args) {
    Object o = choose(991, "800");                                  // (1)
    Number n1 = choose(991, 3.14);                                  // (2)
    Number n2 = Q100A82.<Double>choose((double)991, 3.14);          // (3)
    int k = (int) choose(1.3, 3.14);                                // (4)
    int l = (int) (double) choose(1.3, 3.14);                       // (5)
  }

  public static <T extends Comparable<T>> T choose(T t1, T t2) {
    return t1.compareTo(t2) >= 0 ? t1 : t2;
  }
}
```

Select the two correct answers.

a. The class must be declared as a generic type: public class Q100A82<T extends Comparable<T>> { ... }

b. The compiler reports errors at (1).

c. The compiler reports no errors at (2).

d. The compiler reports no errors at (3).

e. The compiler reports no errors at (4).

f. The compiler reports errors at (5).

Q20 Which of the following statements, when inserted at (1), will make the program print `1` when executed?

Click here to view code image

```
public class Outer {
  private int a = 1;
  private int b = 1;
  private int c = 1;

  class Inner {
```

```
    private int a = 2;
    int get() {
      int c = 3;
      // (1) INSERT CODE HERE
      return c;
    }
  }
  Outer() {
    Inner i = new Inner();
    System.out.println(i.get());
  }

  public static void main(String[] args) {
    new Outer();
  }
}
```

Select the two correct answers.

a. `c = b;`

b. `c = this.a;`

c. `c = this.b;`

d. `c = Outer.this.a;`

e. `c = c;`

Q21 What will be the result of compiling and running the following code?

Click here to view code image

```
public enum FrequentFlyer {
  PLATINUM(20), GOLD(10), SILVER(5), BASIC(0);
  private double extra;

  FrequentFlyer(double extra) {
    this.extra = extra;
  }

  public static FrequentFlyer max(FrequentFlyer c1, FrequentFlyer c2) {
    return c1.compareTo(c2) < 0 ? c2 : c1;
  }
```

```
    public static FrequentFlyer max2(FrequentFlyer c1, FrequentFlyer c2) {
      return c1.extra < c2.extra ? c2 : c1;
    }

    public static void main (String[] args) {
      System.out.println(GOLD.ordinal() > SILVER.ordinal());
      System.out.println(max(GOLD, SILVER));
      System.out.println(max2(GOLD, SILVER));
    }
  }
```

Select the one correct answer.

a. The program will compile and print:

`false`

`SILVER`

`GOLD`

b. The program will compile and print:

`true`

`GOLD`

`SILVER`

c. The program will compile and print:

`true`

`GOLD`

`GOLD`

d. The program will fail to compile, since the enum type `FrequentFlyer` does not implement the `Comparable` interface.

Q22 Which of the following statements are true about the following code?

Click here to view code image

```
public class Vertical {
  private int alt;
  public synchronized void up() {
    ++alt;
  }
  public void down() {
    --alt;
  }
  public synchronized void jump() {
    int a = alt;
    up();
    down();
    System.out.println(a == alt);
  }
}
```

Select the two correct answers.

a. The code will fail to compile.

b. Different threads can execute the `up()` method concurrently.

c. Different threads can execute the `down()` method concurrently.

d. Different threads can execute both the `up()` and the `down()` methods concurrently.

e. The `jump()` method will always print `true`.

Q23 Which parameter declarations can be inserted at (1) so that the program will compile without warnings?

Click here to view code image

```
interface Wagger{}
class Pet implements Wagger{}
class Dog extends Pet {}
class Cat extends Pet {}
public class Q100A51 {
  public static void main(String[] args) {
    List<Pet> p = new ArrayList<>();
    List<Dog> d = new ArrayList<>();
    List<Cat> c = new ArrayList<>();
    examine(p);
    examine(d);
```

```
    examine(c);
  }

  static void examine(/* INSERT PARAMETER TYPE HERE */ pets) {      // (1)
    System.out.print("Your pets need urgent attention.");
  }
}
```

Select the three correct answers.

a. `List<? extends Pet>`

b. `List<? super Pet>`

c. `List<? extends Wagger>`

d. `List<? super Wagger>`

e. `List<?>`

Q24 Given the following code:

Click here to view code image

```
package p1;
public enum Format {
  JPEG, GIF, TIFF;
}
_____________________________________________________________
package p1;
public class Util {
  public enum Format {
    JPEG { public String toString() {return "Jpeggy"; }},
    GIF  { public String toString() {return "Giffy"; }},
    TIFF { public String toString() {return "Tiffy"; }};
  }
  public static <T> void print(T t) {
    System.out.print("|" + t + "|");
  }
}
_____________________________________________________________
import static p1.Util.Format;
import static p1.Util.print;

public class Importing {
```

```
  static final int JPEG = 200;
  public static void main(String[] args) {
    final int JPEG = 100;
    print(JPEG);
    // (1) INSERT CODE HERE
  }
}
```

Which lines of code when inserted at (1) will result in the following output:

```
|100||200||Jpeggy||JPEG|
```

Select the one correct answer.

a. `print(Format.JPEG);`

`print(p1.Format.JPEG);`

`print(Importing.JPEG);`

b. `print(Format.JPEG);`

`print(Importing.JPEG);`

`print(p1.Format.JPEG);`

c. `print(Importing.JPEG);`

`print(Format.JPEG);`

`print(p1.Format.JPEG);`

Q25 What will be the result of compiling and running the following program?

Click here to view code image

```
import java.util.ArrayList;
import java.util.List;
public class Q400A70 {
  public static void main(String[] args) {
    List<Integer> list = new ArrayList<>();
    list.add(2019); list.add(2020); list.add(2021);
    System.out.println("Before: " + list);
    for (int i : list) {
```

```
        int index = list.indexOf(i);
        list.set(index, ++i);
      }
      System.out.println("After:  " + list);
    }
  }
```

Select the one correct answer.

a. The program will print:

```
Before: [2019, 2020, 2021]
```

```
After: [2020, 2021, 2022]
```

b. The program will print:

```
Before: [2019, 2020, 2021]
```

```
After: [2022, 2020, 2021]
```

c. The program will print:

```
Before: [2019, 2020, 2021]
```

```
After: [2019, 2020, 2021]
```

d. The program will print:

```
Before: [2019, 2020, 2021]
```

```
After: [2020, 2021, 2019]
```

e. The program will throw a `java.util.ConcurrentModificationException` at runtime.

Q26 Given the following code:

Click here to view code image

```
public class Person {
  protected transient String name;
  Person() { this.name = "NoName"; }
```

```
  Person(String name) { this.name = name; }
}
```

and

Click here to view code image

```
public class Student extends Person {
  protected long studNum;
  Student() { }
  Student(String name, long studNum) {
    super(name);
    this.studNum = studNum;
  }
}
```

and

Click here to view code image

```
import java.io.Serializable;
public class GraduateStudent extends Student implements Serializable {
  private int year;
  GraduateStudent(String name, long studNum, int year) {
    super(name, studNum);
    this.year = year;
  }

  public String toString() {
    return "(" + name + ", " + studNum + ", " + year + ")";
  }
}
```

and

Click here to view code image

```
import java.io.*;
public class Q800A60 {
  public static void main(String args[])
      throws IOException, ClassNotFoundException {
    try (FileOutputStream outputFile = new FileOutputStream("storage.dat");
         ObjectOutputStream outputStream = new ObjectOutputStream(outputFile)) {
      GraduateStudent stud1 = new GraduateStudent("Aesop", 100, 1);
```

```
      System.out.print(stud1);
      outputStream.writeObject(stud1);
    }

    try (FileInputStream inputFile = new FileInputStream("storage.dat");
         ObjectInputStream inputStream = new ObjectInputStream(inputFile)) {
      GraduateStudent stud2 = (GraduateStudent) inputStream.readObject();
      System.out.println(stud2);
    }
  }
}
```

Which statement is true about the program?

Select the one correct answer.

a. It will fail to compile.

b. It will compile, but it will throw an exception at runtime.

c. It will print `(Aesop, 100, 1)(NoName, 0, 1)`.

d. It will print `(Aesop, 100, 1)(Aesop, 100, 1)`.

e. It will print `(Aesop, 100, 1)(null, 0, 1)`.

Q27 Which of the following statements are true about the classes `SupA`, `SubB`, and `SubC`?

Click here to view code image

```
public class SupA<T> {
  public List<?> fuddle() { return null; }
  public List scuddle(T t) { return null; }
}
public class SubB<U> extends SupA<U> {
  public List fuddle() { return null;}
  public List<?> scuddle(U t) { return null; }
}
public class SubC<V> extends SupA<V> {
  public List<V> fuddle() { return null;}
  public List<? extends Object> scuddle(V t) { return null; }
}
```

Select the four correct answers.

a. Class `SubB` will fail to compile.

b. Class `SubC` will fail to compile.

c. Class `SubB` will compile.

d. Class `SubC` will compile.

e. Class `SubB` overloads the methods in class `SupA`.

f. Class `SubC` overloads the methods in class `SupA`.

g. Class `SubB` overrides the methods in class `SupA`.

h. Class `SubC` overrides the methods in class `SupA`.

Q28 Which of the following statements is true?

Select the one correct answer.

a. If a method does not handle an exception that is thrown, it must declare the exception in a `throws` clause.

b. A `try` block cannot be followed by both a `catch` and a `finally` clause.

c. An empty `catch` clause is not allowed.

d. A `catch` clause cannot follow a `finally` clause.

e. A `finally` clause must always follow one or more `catch` clauses.

Q29 Which import statements, when inserted at (4) in package `p3`, will result in a program that can be compiled and run?

Click here to view code image

```
package p2;
enum March {LEFT, RIGHT;                              // (1)
  public String toString() {
    return "Top-level enum";
  }
}
```

```
public class DefenceInDepth {
  public enum March {LEFT, RIGHT;                  // (2)
    public String toString() {
      return "Static enum";
    }
  }
  public enum Military { INFANTRY, AIRFORCE;
    public static enum March {LEFT, RIGHT;         // (3)
      public String toString() {
        return "Statically nested enum";
      }
    }
  }
}
```

```
package p3;
// (4) INSERT IMPORTS HERE
public class MarchingOrders {
  public static void main(String[] args) {
    System.out.println(March.LEFT);
    System.out.println(DefenceInDepth.March.LEFT);
    System.out.println(p2.DefenceInDepth.March.LEFT);
    System.out.println(Military.March.LEFT);
    System.out.println(DefenceInDepth.Military.March.LEFT);
    System.out.println(p2.DefenceInDepth.Military.March.LEFT);
    System.out.println(LEFT);
  }
}
```

Select the three correct answers.

a.

Click here to view code image

```
import p2.*;
import p2.DefenceInDepth.*;
import static p2.DefenceInDepth.Military.March.LEFT;
```

b.

Click here to view code image

```
import p2.*;
import static p2.DefenceInDepth.*;
```

```
import static p2.DefenceInDepth.Military.March.LEFT;
```

c.

Click here to view code image

```
import p2.DefenceInDepth;
import static p2.DefenceInDepth.*;
import static p2.DefenceInDepth.Military.March.LEFT;
```

d.

Click here to view code image

```
import static p2.DefenceInDepth;
import static p2.DefenceInDepth.*;
import static p2.DefenceInDepth.Military.March.LEFT;
```

e.

Click here to view code image

```
import p2.*;
import static p2.DefenceInDepth.*;
import static p2.DefenceInDepth.Military.*;
```

f.

Click here to view code image

```
import p2.*;
import static p2.DefenceInDepth.*;
import static p2.DefenceInDepth.Military.March;
```

Q30 Which statement is true about the following code?

Click here to view code image

```
public class A {
  public A() {}
  public A(int i) { this(); }
```

```
}

public class B extends A {
  public boolean B(String msg) { return false; }
}

public class C extends B {
  private C() { super(); }
  public C(String msg) { this(); }
  public C(int i) {}
}
```

Select the one correct answer.

a. The code will fail to compile.

b. The constructor in `A` that takes an `int` as an argument will never be called as a result of constructing an object of class `B` or `C`.

c. Objects of class `B` cannot be constructed.

d. At most, one constructor of each class is called as a result of constructing an object of class `C`.

Q31 Given the following class declarations, which expression identifies whether the object referenced by `obj` was created by instantiating class `B` rather than classes `A`, `C`, and `D`?

```
class A {}
class B extends A {}
class C extends B {}
class D extends A {}
```

Select the one correct answer.

a. `obj instanceof B`

b. `obj instanceof A && !(obj instanceof C)`

c. `obj instanceof B && !(obj instanceof C)`

d. `!(obj instanceof C || obj instanceof D)`

e. `!(obj instanceof A) && !(obj instanceof C) && !(obj instanceof D)`

Q32 What will be the result of compiling and running the following code?

Click here to view code image

```
public enum Scale5 {
  GOOD, BETTER, BEST;

  public char getGrade() {
    return switch (this) {
      case GOOD   -> 'C';
      case BETTER -> 'B';
      case BEST   -> 'A';
    };
  }

  public static void main (String[] args) {
    System.out.println(GOOD.getGrade());
  }
}
```

Select the one correct answer.

a. The program will fail to compile, as the `switch` expression is not compatible with the `case` labels.

b. The program will fail to compile, as enum constants cannot be used as `case` labels.

c. The program will fail to compile, as the `case` labels must be qualified with the enum type name.

d. The program will compile, and when run, will print `C`.

e. The program will compile, and when run, will print `GOOD`.

Q33 Which method declarations, when inserted at (7), will not result in a compile-time error?

Click here to view code image

```
// File: MyClass.java
package p4;
```

```
class MySuperclass {
  public        Integer step1(int i)                   { return 1; }     // (1)
  protected     String  step2(String str1, String str2) { return str1; } // (2)
  public        String  step2(String str1)             { return str1; } // (3)
  public static String  step2()                        { return "Hi"; } // (4)

  public MyClass      makeIt()  { return new MyClass(); }               // (5)
  public MySuperclass makeIt2() { return new MyClass(); }               // (6)
}

public class MyClass extends MySuperclass {
  // (7) INSERT METHOD DECLARATION HERE
}
```

Select the two correct answers.

a. `public int step1(int i) { return 1; }`

b. `public String step2(String str2, String str1) { return str1; }`

c. `private void step2() { }`

d. `private static void step2() { }`

e. `private static String step2(String str) { return str; }`

f. `public MySuperclass makeIt() { return new MySuperclass(); }`

g. `public MyClass makeIt2() { return new MyClass(); }`

Q34 What is the result of compiling and running the following program?

Click here to view code image

```
public class Q800A60 {
  static void printFirst(Integer... ints) {
    System.out.println("Integer...: " + ints[0]);
  }

  static void printFirst(Number... nums) {
    System.out.println("Number...: " + nums[0]);
  }

  static void printFirst(Object... objs) {
    System.out.println("Object...: " + objs[0]);
```

```
  }

  public static void main(String[] args) {
    printFirst(10);
    printFirst((byte)20);
    printFirst('3', '0');
    printFirst("40");
    printFirst((short)50, 55);
    printFirst((Number[])new Integer[] {70, 75});
  }
}
```

Select the one correct answer.

a. The program does not compile because of ambiguous method calls.

b. The program will compile and will print:

```
Integer...: 10
Integer...: 20
Integer...: 3
Object...: 40
Integer...: 50
Number...: 70
```

c. The program will compile and will print:

```
Integer...: 10
Number...: 20
Object...: 3
Object...: 40
Number...: 50
Number...: 70
```

d. The program will compile and will print:

```
Integer...: 10
Integer...: 20
Integer...: 3
Object...: 40
Number...: 50
Number...: 70
```

Q35 What will be the result of compiling and running the following program?

Click here to view code image

```
public class Initialization {
  private static String msg(String msg) {
    System.out.println(msg);
    return msg;
  }
  static String m = msg("1");
  { m = msg("2"); }
  static { m = msg("3"); }
  public static void main(String[] args) {
    Object obj = new Initialization();
  }
}
```

Select the one correct answer.

a. The program will fail to compile.

b. The program will compile and print `1`, `2`, and `3` at runtime.

c. The program will compile and print `2`, `3`, and `1` at runtime.

d. The program will compile and print `3`, `1`, and `2` at runtime.

e. The program will compile and print `1`, `3`, and `2` at runtime.

Q36 Given the following resource bundle:

Click here to view code image

```
# File: MyResources_en_US.properties
greeting = Long time no see!
```

Assuming that the current default locale is `"en_US"`, what will be the result of compiling and running the following program?

Click here to view code image

```
import java.util.*;
public class LocatingBundlesForDefaultLocale {
```

```
  public static void main(String[] args) {
    Locale norLocale = new Locale("no", "NO");
    ResourceBundle rbs = ResourceBundle.getBundle("MyResources", norLocale);
    System.out.println(rbs.getString("greeting"));
    Locale.setDefault(norLocale);
    System.out.println(rbs.getString("greeting"));
  }
}
```

Select the one correct answer.

a. When run, the program will print the following and terminate normally. `Long time no see! Long time no see!`

b. When run, the program will print `Long time no see!` and terminate normally.

c. When run, the program will print `Long time no see!` and then throw a `Missing-ResourceException`.

d. When run, the program will immediately throw a `MissingResourceException`.

e. When run, the program will terminate normally without printing anything.

Q37 What will be the result of compiling and running the following program?

Click here to view code image

```
public class Syncher2 {
  static final int[] intArray = new int[2];

  private static void pause() {
    while (intArray[0] == 0) {
      try { intArray.wait(); }
      catch (InterruptedException ie) {
        System.out.println(Thread.currentThread() + " interrupted.");
      }
    }
  }

  public static void main (String[] args) {
    Thread runner = new Thread() {
      public void run() {
        synchronized (intArray) {
          pause();
          System.out.println(intArray[0] + intArray[1]);
```

```
    }}};

    runner.start();
    intArray[0] = intArray[1] = 10;
    synchronized(intArray) {
      intArray.notify();
    }
  }
}
```

Select the one correct answer.

a. The program will fail to compile.

b. The program will compile. When run, it will throw an exception.

c. The program will compile and continue running once started, but will not print anything.

d. The program will compile. When run, it will print `0` and terminate normally.

e. The program will compile. When run, it will print `20` and terminate normally.

f. The program will compile. When run, it will print some number other than `0` or `20`, and terminate normally.

Q38 Given the following code:

Click here to view code image

```
public class Thingy<T> implements Comparable<T> {
  private T value;
  public Thingy(T value) {
    this.value = value;
  }
  public String toString() {
    return value.toString();
  }
  public int compareTo(T obj) {
    return this.value.toString().compareTo(obj.toString());
  }
}
```

and

Click here to view code image

```
import java.math.*;
import java.util.*;
public class TestThingy {
  public static void main(String[] args) {
    Thingy[] values  = {
      new Thingy<BigDecimal>(BigDecimal.valueOf(12.99)),
      new Thingy<BigDecimal>(BigDecimal.valueOf(7.99)),
      new Thingy<BigDecimal>(BigDecimal.valueOf(7)),
      new Thingy<BigDecimal>(BigDecimal.valueOf(9.99))};
    Arrays.sort(values);
    for (Thingy t: values) {
      System.out.print(t + " ");
    }
  }
}
```

What is the result?

Select the one correct answer.

a. `12.99 7.99 7 9.99`

b. `12.99 7 7.99 9.99`

c. `7 7.99 9.99 12.99`

d. `12.99 9.99 7.99 7`

e. The code will throw an exception at runtime.

f. The code will fail to compile.

Q39 Given the following code:

Click here to view code image

```
public class Widget<T> {
  private T value;
  private static int result;
  public Widget(T value) { this.value = value; }
  public void compute(Comparable<T> c) {
    result += c.compareTo(value);
  }
```

```
  public static int getResult() { return result; }
}
```

and

Click here to view code image

```
import java.time.*;
public class TestWidget {
  public static void main(String[] args) {
    Widget<String> t1 = new Widget<>("ACME");
    t1.compute(v -> v.length());
    t1.compute(v -> v.indexOf("C"));
    Widget<LocalDate> t2 = new Widget<>(LocalDate.of(2020, 10, 20));
    t2.compute(v -> v.getDayOfMonth());
    System.out.println(Widget.getResult());
  }
}
```

What is the result?

Select the one correct answer.

a. `23`

b. `24`

c. `25`

d. `13`

e. `14`

f. `15`

g. The code will throw an exception at runtime.

h. The code will fail to compile.

Q40 Given the following code:

Click here to view code image

```
import java.util.*;
public class Test13A10 {
  public static void main(String[] args) {
    Integer[] values = {4, 2, 6, 3, 5};
    Arrays.sort(values, (x, y) -> x - y);
    System.out.println(Arrays.toString(values));
    }
  }
}
```

What is the result?

Select the one correct answer.

a. `[4, 2, 6, 3, 5]`

b. `[2, 3, 4, 5, 6]`

c. `[6, 5, 4, 3, 2]`

d. `[2, -4, 3, -2]`

e. The code will throw an exception at runtime.

f. The code will fail to compile.

Q41 Given the following code:

Click here to view code image

```
import java.time.*;
import java.time.format.DateTimeFormatter;
public class Q700A12 {
  public static void main(String[] args) {
    LocalDate d = LocalDate.of(0, 1, 1);
    DateTimeFormatter dtf = DateTimeFormatter.ofPattern("dd MM yy G");
    System.out.println(d.format(dtf));
  }
}
```

What is the result?

Select the one correct answer.

a. `01 01 01 BC`

b. `00 01 01 BC`

c. `01 01 01 AD`

d. `00 01 01 AD`

Q42 Given the following code:

Click here to view code image

```
Comparable<?>[] values = { LocalDate.of(2022, Month.JANUARY, 1),
    LocalDate.of(2022, Month.FEBRUARY, 5),
    Integer.valueOf(3),
    LocalDateTime.of(2022, Month.JANUARY, 22, 1, 12, 2),
    "4"};
long result = Arrays.stream(values)
    .mapToInt(v -> (v instanceof LocalDateTime ldt)
                   ? ldt.toLocalTime().getSecond() : 1)
    .sum();
System.out.println(result);
```

What is the result?

Select the one correct answer.

a. `2`

b. `4`

c. `6`

d. `8`

e. The code will throw an exception at runtime.

Q43 Given the following code:

Click here to view code image

```
String txt = """
  a
    b
```

```
    c
    """;
txt.lines().map(String::length).forEachOrdered(System.out::print);
```

The first line of the text block has two leading spaces, the second line has four leading spaces, and the third line has two leading spaces. There are two leading white-space on the line with the closing delimiter of the text block.

What is the result of executing the code?

Select the one correct answer.

a. `353`

b. `3530`

c. `1510`

d. `131`

Q44 Given the following code:

Click here to view code image

```
import java.nio.file.*;
public class Test {
  public static void main(String[] args) {
    Path p1 = Path.of("/users/joe");
    Path p2 = Path.of("/users/bob");
    Path p3 = p1.resolve(p1.relativize(p2));
    Path p4 = p3.normalize();
    System.out.println(p3.getName(1) + " " + p4.getName(1));
  }
}
```

What is the result?

Select the one correct answer.

a. `users bob`

b. `joe users`

c. `joe bob`

d. `users users`

Q45 Given the following code:

Click here to view code image

```
import java.util.*;
public class Localizing {  public static void main(String[] args) {
    ResourceBundle rb = ResourceBundle.getBundle("resources", new Locale("en"));
    DateTimeFormatter fmt = DateTimeFormatter.ofPattern(rb.getString("f1"),
                                                        new Locale("en","GB"));
    LocalDate d = LocalDate.of(2022, 4, 1);
    System.out.println(fmt.format(d));
  }
}
```

and

Click here to view code image

```
// File: resources.properties
f1=yy-MMM-dd
```

and

Click here to view code image

```
// File: resources_en.properties
f2=MMM-dd-yy
```

and

Click here to view code image

```
// File: resources_en_GB.properties
f1=dd-MMM-yy
```

What is the result?

Select the one correct answer.

a. `01-Apr-22`

b. `22-Apr-01`

c. `Apr-01-22`

d. The code will throw an exception at runtime.

Q46 Given the following code:

Click here to view code image

```
public class TestX {
  public static void main(String[] args) {
    System.out.println(action(Integer.valueOf("1")));
  }
  public static boolean action(Object obj) {
    return (obj instanceof String value1 && value1.contains("1") ||
            obj instanceof Integer value2 && value2.intValue() < 1);
    }
}
```

What is the result?

Select the one correct answer.

a. `true`

b. `false`

c. The program will throw an exception at runtime.

d. The program will fail to compile.

Q47 Given the following code:

Click here to view code image

```
import java.time.Duration;
public record Song(String title, Duration duration) {
  // (1) INSERT CODE HERE
}
```

and

Click here to view code image

```
public class TestY {
  public static void main(String[] args) {
    Song song = new Song("Imagine", 106);
    System.out.println(song);
  }
}
```

Which option can be inserted into the `Song` record declaration at (1), so that the program will print `Song[title=IMAGINE, duration=PT1M46S]`?

Select the one correct answer.

a.

Click here to view code image

```
public Song(int seconds) {
     this(this.title.toUpperCase(), Duration.ofSeconds(seconds));
   }
```

b.

Click here to view code image

```
public Song(int seconds) {
     this(title.toUpperCase(), Duration.ofSeconds(seconds));
   }
```

c.

Click here to view code image

```
public Song(String title, int seconds) {
     this(title.toUpperCase(), Duration.ofSeconds(seconds));
   }
```

d.

Click here to view code image

```
public Song(String title, int seconds) {
     this.title = title.toUpperCase();
     this.duration = Duration.ofSeconds(seconds);
   }
```

e.

Click here to view code image

```
public Song {
     this.title.toUpperCase();
     this.duration = Duration.ofSeconds(seconds));
   }
```

Q48 Given the following directory structure under the directory `./Sun`:

Click here to view code image

```
./Sun/1_Mercury
./Sun/2_Venus
./Sun/3_Earth
./Sun/3_Earth/1_Moon
./Sun/4_Mars
./Sun/4_Mars/1_Phobos
./Sun/4_Mars/2_Deimos
./Sun/5_Jupiter
./Sun/5_Jupiter/1_Io
./Sun/5_Jupiter/2_Europa
./Sun/5_Jupiter/3_Ganymede
./Sun/5_Jupiter/4_Calisto
./Sun/6_Saturn
./Sun/7_Uranus
./Sun/8_Neptune
```

and the code:

Click here to view code image

```
try {
  Path sun = Path.of("./Sun");
  Files.walk(sun)
       .map(p->p.getName(p.getNameCount()-1).toString())
       .sorted()
```

```
        .limit(3)
        .forEach(p->System.out.println(p.substring(2)));
} catch (IOException e) {
  e.printStackTrace();
}
```

What is the result?

Select the one correct answer.

a.

```
Io
Mercury
```

b.

```
Io
Mercury
Moon
```

c.

```
Io
Mercury
Moon
Phobos
```

d.

```
Earth
Ganymede
```

e.

```
Venus
Deimos Europa
```

Q49 Given the text file `data.txt` that contains following lines:

```
Apple:1.99
Pear:1.70
Apple:1.70
Apple:1.75
Orange:1.99
```

and the following code:

Click here to view code image

```
try {
  Path test = Path.of("data.txt");
  Map<String, List<String>> values
      = Files.lines(test).collect(Collectors.groupingBy(
                                      ln -> ln.substring(ln.indexOf(":") + 1)));
  System.out.println(values);
} catch (IOException e) {
  e.printStackTrace();
}
```

What is the result?

Select the one correct answer.

a. `{1.70=[1.70, 1.70], 1.99=[1.99, 1.99], 1.75=[1.75]}`

b. `{1.70=[Pear:1.70, Apple:1.70], 1.99=[Apple:1.99, Orange:1.99], 1.75=[Apple:1.75]}`

c. `{1.70=[Pear, Apple], 1.99=[Apple, Orange], 1.75=[Apple]}`

d. `{Apple=[Apple:1.99, Apple:1.70, Apple:1.75], Pear=[Pear:1.70], Orange=[Orange:1.99]}`

e. `{Apple=[1.99, 1.70, 1.75], Pear=[1.70], Orange=[1.99]}`

f. `{Apple=[Apple, Apple, Apple], Pear=[Pear], Orange=[Orange]}`

Q50 Given the following code:

Click here to view code image

```
module travel {
  requires transport;
  uses transport.mode.TransportType;
}
```

and

```
module transport {
  exports transport.mode;
}
```

What is the correct declaration for a module named `basic` that implements the `TransportType` service?

Select the one correct answer.

a.

Click here to view code image

```
module basic {
  requires travel;
  provides travel.mode.TransportType with basic.mode.Horse;
}
```

b.

Click here to view code image

```
module basic {
  requires transport.mode;
  provides TransportType with Horse;
}
```

c.

Click here to view code image

```
module basic {
  requires transport;
```

```
  provides transport.mode.TransportType with basic.mode.Horse;
}
```

d.

Click here to view code image

```
module basic {
  requires travel.mode;
  provides TransportType with Horse;
}
```