OCP - Test

1. What is the result of the following code?

```
public class Employee {
   public int employeeId;
   public String firstName, lastName;
   public int yearStarted;
   @Override public int hashCode() {
      return employeeId;
   }
   public boolean equals(Employee e) {
      return this.employeeId == e.employeeId;
   }
   public static void main(String[] args) {
      Employee one = new Employee();
      one.employeeId = 101;
      Employee two = new Employee();
      two.employeeId = 101;
      if (one.equals(two)) System.out.println("Success");
      else System.out.println("Failure");
  } }
```

A. Success
B. Failure
C. The hashCode() method fails to compile.
D. The equals() method fails to compile.
E. Another line of code fails to compile.
F. A runtime exception is thrown.

2. What is the output of the following?

```
Stream<String> stream = Stream.iterate("", (s) -> s + "1");
System.out.println(stream.limit(2).map(x -> x + "2"));
```

A. 12112
B. 212
C. 212112
D. java.util.stream.ReferencePipeline$3@4517d9a3
E. The code does not compile.
F. An exception is thrown.
G. The code hangs.

3. Which of the following creates valid locales, assuming that the language and country codes follow standard conventions? (Choose all that apply.)

A. new Locale("hi");
B. new Locale("hi", "IN");
C. new Locale("IN");
D. new Locale("IN", "hi");
E. Locale.create("hi");
F. Locale.create("IN");

4. Which of the following pairs fills in the blanks to make this code compile?

```
5:    public void read() ___________ SQLException {
6:        ___________ new SQLException();
7:   }
```

A. throw on line 5 and throw on line 6
B. throw on line 5 and throws on line 6
C. throws on line 5 and throw on line 6
D. throws on line 5 and throws on line 6
E. None of the above. SQLException is a checked exception and cannot be thrown.
F. None of the above. SQLException is a runtime exception and cannot be thrown.

5. Given an instance of a Stream, s, and a Collection, c, which are valid ways of creating a parallel stream? (Choose all that apply.)

A. new ParallelStream(s)
B. c.parallel()
C. s.parallelStream()
D. c.parallelStream()
E. new ParallelStream(c)
F. s.parallel()

6. Which classes will allow the following to compile? (Choose all that apply.)

```
InputStream is = new BufferedInputStream(new
      FileInputStream("zoo.txt"));
InputStream wrapper = new ________________ (is);
```

A. BufferedInputStream
B. FileInputStream
C. BufferedWriter
D. ObjectInputStream
E. ObjectOutputStream
F. BufferedReader

7. What is the output of the following code?

```
Path path = Path.get("/user/.././root","../kodiacbear.txt");
path.normalize().relativize("/lion");
System.out.println(path);
```

A. /user/.././root/../kodiacbear.txt
B. /user/./root/kodiacbear.txt/lion
C. /kodiacbear.txt
D. kodiacbear.txt
E. ../lion
F. The code does not compile.

8. Which interfaces or classes are in a database-specific JAR file? (Choose all that apply.)

A. Driver
B. Driver’s implementation
C. DriverManager
D. DriverManager’s implementation
E. Statement
F. Statement’s implementation

9**. What is the result of compiling the following class?**

```
public class Book {
   private int ISBN;
   private String title, author;
   private int pageCount;
   public int hashCode() {
      return ISBN;
   }
   @Override public boolean equals(Object obj) {
     if ( !(obj instanceof Book)) {
        return false;
     }
     Book other = (Book) obj;
     return this.ISBN == other.ISBN;
   }
// imagine getters and setters are here
}
```

A. The code compiles.
B. The code does not compile because hashCode() is incorrect.
C. The code does not compile because equals() does not override the parent method correctly.
D. The code does not compile because equals() tries to refer to a private field.
E. The code does not compile because the ClassCastException is not handled or declared.

F. The code does not compile for another reason.

10. Suppose that you need to work with a collection of elements that need to be sorted in their natural order, and each element has a unique string associated with its value. Which of the following collections classes in the java.util package best suit your needs for this scenario?

A. ArrayList
B. HashMap
C. HashSet
D. TreeMap
E. TreeSet
F. Vector

11. What is the result of the following code?

```
1: public interface CanClimb {
2:    public abstract void climb();
3: }
4: public interface CanClimbTrees extends CanClimb {}
5: public abstract class Chipmunk implements CanClimbTrees {
6:    public abstract void chew();
7: }
8: public class EasternChipmunk extends Chipmunk {
9:    public void chew() { System.out.println("Eastern Chipmunk is
Chewing"); }
10: }
```

A. It compiles and runs without issue.
B. The code will not compile because of line 2.
C. The code will not compile because of line 4.
D. The code will not compile because of line 5.
E. The code will not compile because of line 8.
F. It compiles but throws an exception at runtime.

12. Which of the following changes when made independently would make this code compile? (Choose all that apply.)

```
1:    public class StuckTurkeyCage implements AutoCloseable {
2:       public void close() throws Exception {
3:          throw new Exception("Cage door does not close");
4:       }
5:       public static void main(String[] args) {
6:          try (StuckTurkeyCage t = new StuckTurkeyCage()) {
7:            System.out.println("put turkeys in");
8:          }
9:       }
10:   }
```

A. Remove throws Exception from the declaration on line 2.
B. Add throws Exception to the declaration on line 5.
C. Change line 8 to } catch (Exception e) {}.
D. Change line 8 to } finally {}.
E. None of the above will make the code compile.
F. The code already compiles as is.

13. Which are required parts of a JDBC URL? (Choose all that apply.)

A. Connection parameters
B. Database name
C. jdbc
D. Location of database
E. Port
F. Password

14. What is the result of the following code?

```
String s1 = "Canada";
String s2 = new String(s1);
if(s1 == s2) System.out.println("s1 == s2");
if(s1.equals(s2)) System.out.println("s1.equals(s2)");
```

A. There is no output.
B. s1 == s2
C. s1.equals(s2)
D. Both B and C.
E. The code does not compile.
F. The code throws a runtime exception.

15. What is the result of the following statements?

```
3:     List list = new ArrayList();
4:     list.add("one");
5:     list.add("two");
6:     list.add(7);
7:     for (String s: list)
8:     System.out.print(s);
```

A. onetwo
B. onetwo7
C. onetwo followed by an exception
D. Compiler error on line 6
E. Compiler error on line 7

16. Which of the following are valid functional interfaces? (Choose all that apply.)

```
public interface Climb {
   public int climb();
}
public abstract class Swim {
   public abstract Object swim(double speed, int duration);
}
public interface ArcticMountainClimb extends MountainClimb {
   public default int getSpeed();
}
public interface MountainClimb extends Climb {}
```

A. Climb
B. Swim
C. ArcticMountainClimb
D. MountainClimb
E. None of these are valid functional interfaces.

17. Which of the following are true? (Choose all that apply.)

A. All keys must be in the same resource bundle file to be used.
B. All resource bundles defined as Java classes can be expressed using the property file format instead.
C. All resource bundles defined as property files can be expressed using the Java class list bundle format instead.
D. Changing the default locale lasts for only a single run of the program.
E. It is forbidden to have both Props_en.java and Props_en.properties in the classpath of an application.

18. What is the output of the following?

```
Predicate<? super String> predicate = s -> s.length() > 3;
Stream<String> stream = Stream.iterate("-", (s) -> s + s);
boolean b1 = stream.noneMatch(predicate);
boolean b2 = stream.anyMatch(predicate);
System.out.println(b1 + " " + b2);
```

A. false true
B. false false
C. java.util.stream.ReferencePipeline$3@4517d9a3
D. The code does not compile.
E. An exception is thrown.
F. The code hangs.

19. Which of the following fills in the blank to make the code compile? (Choose all that apply)

```
public static void main(String[] args)  {
   try {
      throw new IOException();
   } catch (__________________________ ) { }
}
```

A. FileNotFoundException | IOException e
B. FileNotFoundException e | IOException e
C. FileNotFoundException | RuntimeException e
D. FileNotFoundException e | RuntimeException e
E. IOException | RuntimeException e
F. IOException e | RuntimeException e

20. What is the result of executing the following code? (Choose all that apply.)

```
1: Path path = Paths.get("sloth.schedule");
2: BasicFileAttributes attributes = Files.readAttributes(path,
BasicFileAttributes.class);
3: if(attributes.size()>0 && attributes.creationTime().toMillis()>0) {
4:    attributes.setTimes(null,null,null);
5: }
```

A. It compiles and runs without issue.
B. The code will not compile because of line 2.
C. The code will not compile because of line 3.
D. The code will not compile because of line 4.
E. The code compiles but throws an exception at runtime.

21. Which lines need to be changed to make the code compile? (Choose all that apply.)

```
ExecutorService service =
      Executors.newSingleThreadScheduledExecutor();
service.scheduleWithFixedDelay(() -> { // w1
       System.out.println("Open Zoo");
       return null; // w2
   }, 0, 1, TimeUnit.MINUTES);
Future<?> result =
      service.submit(() -> System.out.println("Wake Staff")); // w3
System.out.println(result.get()); // w4
```

A. It compiles and runs without issue.
B. Line w1
C. Line w2
D. Line w3
E. Line w4
F. It compiles but throws an exception at runtime.

22. Which of the following is a valid JDBC URL?

A. jdbc:sybase:localhost:1234/db
B. jdbc::sybase::localhost::/db
C. jdbc::sybase:localhost::1234/db
D. sybase:localhost:1234/db
E. sybase::localhost::/db
F. sybase::localhost::1234/db

23. What is true about the following code? You may assume city and mascot are never null.

```
public class BaseballTeam {
   private String city, mascot;
   private int numberOfPlayers;
   public boolean equals(Object obj) {
      if ( !(obj instanceof BaseballTeam))
        return false;
      BaseballTeam other = (BaseballTeam) obj;
      return (city.equals(other.city) &&
mascot.equals(other.mascot));
   }
   public int hashCode() {
      return numberOfPlayers;
   }
// imagine getters and setters are here
}
```

A. The class does not compile.
B. The class compiles but has an improper equals() method.
C. The class compiles but has an improper hashCode() method.
D. The class compiles and has proper equals() and hashCode() methods.

24. Which of the following are valid lambda expressions? (Choose all that apply.)

A. () -> ""
B. x,y -> x+y
C. (Coyote y) -> return 0;
D. (Camel c) -> {return;}
E. Wolf w -> 39
F. () ->
G. (Animal z, m) -> a

25. Which are true statements about terminal operations in a stream? (Choose all that apply.)

A. At most one terminal operation can exist in a stream pipeline.
B. Terminal operations are a required part of the stream pipeline in order to get a result.
C. Terminal operations have Stream as the return type.
D. The referenced Stream may be used after the calling a terminal operation.
E. The peek() method is an example of a terminal operation.

26. Assume that all bundles mentioned in the answers exist and define the same keys. Which one will be used to find the key in line 8?

```
6:     Locale.setDefault(new Locale("en", "US"));
7:     ResourceBundle b = ResourceBundle.getBundle("Dolphins");
8:     b.getString("name");
```

A. Dolphins.properties
B. Dolphins_en.java
C. Dolphins_en.properties
D. Whales.properties
E. Whales_en_US.properties
F. The code does not compile.

27. Which of the following are true statements? (Choose all that apply.)

A. A traditional try statement without a catch block requires a finally block.
B. A traditional try statement without a finally block requires a catch block.
C. A traditional try statement with only one statement can omit the {}.
D. A try-with-resources statement without a catch block requires a finally block.
E. A try-with-resources statement without a finally block requires a catch block.
F. A try-with-resources statement with only one statement can omit the {}.

28. What statement about the following code is true?

```
AtomicLong value1 = new AtomicLong(0);
final long[] value2 = {0};
IntStream.iterate(1, i -> 1).limit(100).parallel()
    .forEach(i -> value1.incrementAndGet());
IntStream.iterate(1, i -> 1).limit(100).parallel()
         .forEach(i -> ++value2[0]);
System.out.println(value1+" "+value2[0]);
```

A. It outputs 100 100.
B. It outputs 100 99.
C. The output cannot be determined ahead of time.
D. The code does not compile.
E. It compiles but throws an exception at runtime.
F. It compiles but enters an infinite loop at runtime.

29. Which of the following can fill in the blank to make the code compile? (Choose all that apply.)

Console c = System.console();
String s = _______________;

A. c.input()
B. c.read()
C. c.readLine()
D. c.readPassword()
E. c.readString()
F. None of the above

30. If the current working directory is /user/home, then what is the output of the following code?

```
Path path = Paths.get("/zoo/animals/bear/koala/food.txt");
System.out.println(path.subpath(1,3).getName(1).toAbsolutePath());
```

A. animals/bear
B. koala
C. /user/home/bear
D. /user/home/koala/koala
E. /user/home/food.txt
F. /user/home/koala/food.txt
G. The code does not compile.

31. What file is required inside a JDBC 4.0+ driver JAR?

A. java.sql.Driver
B. META-INF/java.sql.Driver
C. META-INF/db/java.sql.Driver
D. META-INF/database/java.sql.Driver
E. META-INF/service/java.sql.Driver

32. Which of the following statements are true, assuming a and b are String objects? (Choose all that apply.)

A. If a.equals(b) is true, a.hashCode() == b.hashCode() is always true.
B. If a.equals(b) is true, a.hashCode() == b.hashCode() is sometimes but not always true.
C. If a.equals(b) is false, a.hashCode() == b.hashCode() can never be true.
D. If a.equals(b) is false, a.hashCode() == b.hashCode() can sometimes be true.

33. Suppose that we have the following property files and code. Which bundles are used on lines 8 and 9 respectively?

```
Dolphins.properties
name=The Dolphin
age=0

Dolphins_en.properties
name=Dolly
age=4

Dolphins_fr.properties
name=Dolly
```

```
5:    Locale fr = new Locale("fr");
6:    Locale.setDefault(new Locale("en", "US"));
7:    ResourceBundle b = ResourceBundle.getBundle("Dolphins", fr);
8:    b.getString("name");
9:    b.getString("age");
```

A. Dolphins.properties and Dolphins.properties
B. Dolphins.properties and Dolphins_en.properties
C. Dolphins_en.properties and Dolphins_en.properties
D. Dolphins_fr.properties and Dolphins.properties
E. Dolphins_fr.properties and Dolphins_en.properties
F. The code does not compile.

34. What is the output of the following code?

```
import java.io.*;
public class AutocloseableFlow {
   static class Door implements AutoCloseable {
      public void close() {
         System.out.print("D");
      } }
   static class Window implements Closeable {
      public void close() {
         System.out.print("W");
         throw new RuntimeException();
   } }
   public static void main(String[] args) {
      try (Door d = new Door(); Window w = new Window()) {
         System.out.print("T");
      } catch (Exception e) {
         System.out.print("E");
      } finally {
         System.out.print("F");
      } } }
```

A. TWF
B. TWDF
C. TWDEF
D. TWF followed by an exception
E. TWDF followed by an exception
F. TWEF followed by an exception
G. The code does not compile.

35. What is the result of executing the following code? (Choose all that apply.)

```
String line;
Console c = System.console();
Writer w = c.writer();
if ((line = c.readLine()) != null)
   w.append(line);
w.flush();
```

A. The code runs without error but prints nothing.
B. The code prints what was entered by the user.
C. An ArrayIndexOutOfBoundsException might be thrown.
D. A NullPointerException might be thrown.
E. An IOException might be thrown.
F. The code does not compile.

36. Assume /kang exists as a symbolic link to the directory /mammal/kangaroo within the file system. Which of the following statements are correct about this code snippet? (Choose all that apply.)

```
Path path = Paths.get("/kang");
if(Files.isDirectory(path) && Files.isSymbolicLink(path))
   Files.createDirectory(path.resolve("joey"));
```

A. A new directory will always be created.
B. A new directory will be created only if /mammal/kangaroo exists.
C. If the code creates a directory, it will be reachable at /kang/joey.
D. If the code creates a directory, it will be reachable at /mammal/kangaroo/joey.
E. The code does not compile.
F. The code will compile but always throws an exception at runtime.

37. Suppose that you have a table named animal with two rows. What is the result of the following code?

```
6:  Connection conn = new Connection(url, userName, password);
7:  Statement stmt = conn.createStatement();
8:  ResultSet rs = stmt.executeQuery("select count(*) from animal");
9:  if (rs.next()) System.out.println(rs.getInt(1));
```

A. 0
B. 2
C. There is a compiler error on line 6.
D. There is a compiler error on line 9.
E. There is a compiler error on another line.
F. A runtime exception is thrown.

38. What is the result of the following code?

```
public class FlavorsEnum {
   enum Flavors { VANILLA, CHOCOLATE, STRAWBERRY }
   public static void main(String[] args) {
      System.out.println(Flavors.CHOCOLATE.ordinal());
   }
}
```

A. 0
B. 1
C. 9
D. CHOCOLATE
E. The code does not compile due to a missing semicolon.
F. The code does not compile for a different reason.

39. What is the result of the following code?

```
1:    public class Hello<T> {
2:       T t;
3:       public Hello(T t) { this.t = t; }
4:       public String toString() { return t.toString(); }
5:       public static void main(String[] args) {
6:          System.out.print(new Hello<String>("hi"));
7:          System.out.print(new Hello("there"));
8:       } }
```

- A. hi
- B. hi followed by a runtime exception
- C. hithere
- D. Compiler error on line 4
- E. Compiler error on line 6
- F. Compiler error on line 7

40. What is the result of the following class?

```
import java.util.function.*;
public class Panda {
   int age;
   public static void main(String[] args) {
      Panda p1 = new Panda();
      p1.age = 1;
      check(p1, p -> p.age < 5);  // h1
   }
   private static void check(Panda panda, Predicate<Panda> pred) {
// h2
      String result = pred.test(panda) ? "match": "not match";  //
h3
      System.out.print(result);
} }
```

- A. match
- B. not match
- C. Compiler error on line h1.
- D. Compiler error on line h2.
- E. Compile error on line h3.
- F. A runtime exception is thrown.

41. Which of the following can fill in the blank so that the code prints out false? (Choose all that apply.)

```
Stream<String> s = Stream.generate(() -> "meow");
boolean match = s.________________(String::isEmpty);
System.out.println(match);
```

A. allMatch
B. anyMatch
C. findAny
D. findFirst
E. noneMatch
F. None of the above

42. Which of the following can be inserted into the blank to create a date of June 21, 2014? (Choose all that apply.)

```
import java.time.*;

public class StartOfSummer {
  public static void main(String[] args) {
  LocalDate date = _________________________
} }
```

A. new LocalDate(2014, 5, 21);
B. new LocalDate(2014, 6, 21);
C. LocalDate.of(2014, 5, 21);
D. LocalDate.of(2014, 6, 21);
E. LocalDate.of(2014, Calendar.JUNE, 21);
F. LocalDate.of(2014, Month.JUNE, 21);

43. Which happens when more tasks are submitted to a thread executor than available threads?

A. The thread executor will throw an exception when a task is submitted that is over its thread limit.
B. The task will be added to an internal queue and completed when there is an available thread.
C. The thread executor will discard any task over its thread limit.
D. The call to submit the task to the thread executor will wait until there is a thread available before continuing.
E. The thread executor creates new temporary threads to complete the additional tasks.

44. What is the output of the following code?

```
import java.io.*;
public class AutocloseableFlow {
   static class Door implements AutoCloseable {
      public void close() {
         System.out.print("D");
         throw new RuntimeException();
      } }
   static class Window implements Closeable {
      public void close() {
         System.out.print("W");
         throw new RuntimeException();
   } }
   public static void main(String[] args) {
      try {
        Door d = new Door(); Window w = new Window()
      }
      {
         System.out.print("T");
      } catch (Exception e) {
         System.out.print("E");
      } finally {
         System.out.print("F");
      } } }
```

A. TWF
B. TWDF
C. TWDEF
D. TWF followed by an exception
E. TWDF followed by an exception
F. TWEF followed by an exception
G. The code does not compile.

45. Which of the following are true statements about serialization in Java? (Choose all that apply.)

A. The process of converting serialized data back into memory is called deserialization.
B. All non-thread classes should be marked Serializable.
C. The Serializable interface requires implementing serialize() and deserialize() methods.
D. The Serializable interface is marked final and cannot be extended.
E. The readObject() method of ObjectInputStream may throw a ClassNotFoundException even if the return object is not explicitly cast.

46. Given that /animals is a directory that exists and it is empty, what is the result of the following code?

```
Path path = Paths.get("/animals");
boolean myBoolean = Files.walk(path)
   .filter((p,a) -> a.isDirectory() && !path.equals(p)) // w1
   .findFirst().isPresent();  // w2
System.out.println(myBoolean ? "No Sub-directory": "Has Sub-
directory");
```

A. It prints No Sub-directory.
B. It prints Has Sub-directory.
C. The code will not compile because of line w1.
D. The code will not compile because of line w2.
E. The output cannot be determined.
F. It produces an infinite loop at runtime.

47. What is the result of the following code? (Choose all that apply.)

```
public class IceCream {
   enum Flavors { VANILLA, CHOCOLATE, STRAWBERRY }
   public static void main(String[] args) {
      Flavors f = Flavors.STRAWBERRY;
      switch (f) {
         case 0: System.out.println("vanilla");
         case 1: System.out.println("chocolate");
         case 2: System.out.println("strawberry");
              break;
         default: System.out.println("missing flavor");
     } } }
```

A. vanilla
B. chocolate
C. strawberry
D. missing flavor
E. The code does not compile.
F. An exception is thrown.

48. Which of the following statements are true? (Select two.)

```
3:     Set<Number> numbers = new HashSet<>();
4:     numbers.add(new Integer(86));
5:     numbers.add(75);
6:     numbers.add(new Integer(86));
7:     numbers.add(null);
8:     numbers.add(309L);
9:     Iterator iter = numbers.iterator();
10:    while (iter.hasNext())
11:       System.out.print(iter.next());
```

A. The code compiles successfully.
B. The output is 8675null309.
C. The output is 867586null309.
D. The output is indeterminate.
E. There is a compiler error on line 3.
F. There is a compiler error on line 9.
G. An exception is thrown.

49. What changes need to be made to make the following immutable object pattern correct? (Choose all that apply.)

```
import java.util.List;
public class Seal {
   String name;
   private final List<Seal> friends;
   public Seal(String name, List<Seal> friends) {
      this.name = name;
      this.friends = friends;
   }
   public String getName() { return name; }
   public List<Seal> getFriends() { return friends; }
}
```

A. None; the immutable object pattern is properly implemented.
B. Have Seal implement the Immutable interface.
C. Mark name final and private.
D. Add setters for name and List<Seal> friends.
E. Replace the getFriends() method with methods that do not give the caller direct access to the List<Seal> friends.
F. Change the type of List<Seal> to List<Object>.
G. Make a copy of the List<Seal> friends in the constructor.
H. Mark the Seal class final.

50. We have a method that returns a sorted list without changing the original. Which of the following can replace the method implementation to do the same with streams?

```
private static List<String> sort(List<String> list) {
   List<String> copy = new ArrayList<>(list);
   Collections.sort(copy, (a, b) -> b.compareTo(a));
   return copy;
}
```

A. return list.stream().compare((a, b) -> b.compareTo(a)).collect(Collectors.toList());
B. return list.stream().compare((a, b) -> b.compareTo(a)).sort();
C. return list.stream().compareTo((a, b) -> b.compareTo(a)).collect(Collectors.toList());
D. return list.stream().compareTo((a, b) -> b.compareTo(a)).sort();
E. return list.stream().sorted((a, b) -> b.compareTo(a)).collect();
F. return list.stream().sorted((a, b) -> b.compareTo(a)).collect(Collectors.toList());

51. What is the output of the following code?

```
LocalDate date = LocalDate.parse(
"2018-04-30", DateTimeFormatter.ISO_LOCAL_DATE);
date.plusDays(2);
date.plusHours(3);
System.out.println(date.getYear() + " "
  + date.getMonth() + " "+ date.getDayOfMonth());
```

A. 2018 APRIL 2
B. 2018 APRIL 30
C. 2018 MAY 2
D. The code does not compile.
E. A runtime exception is thrown.

52. What is the result of running java EchoInput hi there with the following code?

```
public class EchoInput {
   public static void main(String [] args) {
      if(args.length <= 3) assert false;
      System.out.println(args[0] + args[1] + args[2]);
   }
}
```

A. hithere
B. The assert statement throws an AssertionError.
C. The code throws an ArrayIndexOutOfBoundsException.
D. The code compiles and runs successfully, but there is no output.
E. The code does not compile.

53. Fill in the blank: _______________ is the topmost directory on a file system.

A. Absolute
B. Directory
C. Parent
D. Root
E. Top

54. If the current working directory is /zoo, and the path /zoo/turkey does not exist, then what is the result of executing the following code? (Choose all that apply.)

```
Path path = Paths.get("turkey");
if(Files.isSameFile(path,Paths.get("/zoo/turkey")))  // x1
   Files.createDirectory(path.resolve("info"));  // x2
```

A. The code compiles and runs without issue, but it does not create any directories.

B. The directory /zoo/turkey is created.
C. The directory /zoo/turkey/info is created.
D. The code will not compile because of line x1.
E. The code will not compile because of line x2.
F. It compiles but throws an exception at runtime.

55. What is the result of the following code?

```
TreeSet<String> tree = new TreeSet<String>();
tree.add("one");
tree.add("One");
tree.add("ONE");
System.out.println(tree.ceiling("On"));
```

A. On
B. one
C. One
D. ONE
E. The code does not compile.
F. An exception is thrown.

56. Which of the following are true of interfaces? (Choose all that apply.)

A. They can extend other classes.
B. They cannot be extended.
C. They enable classes to have multiple inheritance.
D. They can only contain abstract methods.
E. They can be declared final.
F. All members of an interface are public.

56. What is the output of the following code?

```
LocalDate date = LocalDate.of(2018, Month.APRIL, 40);
System.out.println(date.getYear() + " " + date.getMonth()
   + " "+ date.getDayOfMonth());
```

A. 2018 APRIL 4
B. 2018 APRIL 30
C. 2018 MAY 10
D. Another date
E. The code does not compile.
F. A runtime exception is thrown.

57. Which of the following command lines cause this program to fail on the assertion? (Choose all that apply.)

```
public class On {
   public static void main(String[] args) {
      String s = null;
```

```
        assert s != null;
    }
}
```

A. java –da On
B. java –ea On
C. java -da -ea:On On
D. java -ea -da:On On
E. The code does not compile.

58. What statements about the following code are true? (Choose all that apply.)

```
Integer i1 = Arrays.asList(1,2,3,4,5).stream().findAny().get();
synchronized(i1) { // y1
    Integer i2 = Arrays.asList(6,7,8,9,10)
        .parallelStream()
        .sorted()  // y2
        .findAny().get(); // y3
    System.out.println(i1+" "+i2);
}
```

A. It outputs 1 6.
B. It outputs 1 10.
C. The code will not compile because of line y1.
D. The code will not compile because of line y2.
E. The code will not compile because of line y3.
F. It compiles but throws an exception at runtime.
G. The output cannot be determined ahead of time.
H. It compiles but waits forever at runtime.

59. Assuming / is the root directory, which of the following are true statements? (Choose all that apply.)

A. /home/parrot is an absolute path.
B. /home/parrot is a directory.
C. /home/parrot is a relative path.
D. The path pointed to from a File object must exist.
E. The parent of the path pointed to by a File object must exist.

60. What is the output of the following code?

```
Path path1 = Paths.get("/pets/../cat.txt");
Path path2 = Paths.get("./dog.txt");
System.out.println(path1.resolve(path2));
System.out.println(path2.resolve(path1));
```

A. /pets/../cat.txt/./dog.txt
/pets/../cat.txt

B. /pets/../cat.txt/./dog.txt
./dog.txt/pets/../cat.txt

C. /cats.txt
/dog.txt

D. /cats.txt/dog.txt
/cat.txt

E. It compiles but throws an exception at runtime.

61. What is the result of the following code?

```
1:    public class Outer {
2:    private int x = 24;
3:    public int getX() {
4:       String message = "x is ";
5:       class Inner {
6:          private int x = Outer.this.x;
7:          public void printX() {
8:             System.out.println(message + x);
9:          }
10:      }
11:      Inner in = new Inner();
12:      in.printX();
13:      return x;
14:   }
15:   public static void main(String[] args) {
16:      new Outer().getX();
17:   } }
```

A. x is 0.
B. x is 24.
C. Line 6 generates a compiler error.
D. Line 8 generates a compiler error.
E. Line 11 generates a compiler error.
F. An exception is thrown.

62. Which of the answer choices are valid given the following declaration?

```
Map<String, Double> map = new HashMap<>();
```

A. map.add("pi", 3.14159);
B. map.add("e", 2L);
C. map.add("log(1)", new Double(0.0));
D. map.add('x', new Double(123.4));
E. None of the above

83. What changes need to be made to make the following singleton pattern correct? (Choose all that apply.)

```
public class CheetahManager {
   public static CheetahManager cheetahManager;
   private CheetahManager() {}
   public static CheetahManager getCheetahManager() {
      if(cheetahManager == null) {
         cheetahManager = new CheetahManager();
      }
      return cheetahManager;
   }
}
```

A. None; the singleton pattern is properly implemented.
B. Rename cheetahManager to instance.
C. Rename getCheetahManager() to getInstance().
D. Change the access modifier of cheetahManager from public to private.
E. Mark cheetahManager final.
F. Add synchronized to getCheetahManager().

63. Which of the following can we add after line 5 for the code to run without error and not produce any output? (Choose all that apply.)

```
4: LongStream ls = LongStream.of(1, 2, 3);
5: OptionalLong opt = ls.map(n -> n * 10)
      .filter(n -> n < 5).findFirst();
```

A. if (opt.isPresent()) System.out.println(opt.get());
B. if (opt.isPresent()) System.out.println(opt.getAsLong());
C. opt.ifPresent(System.out.println)
D. opt.ifPresent(System.out::println)
E. None of these; the code does not compile.
F. None of these; line 5 throws an exception at runtime.

64. Which of the following prints OhNo with the assertion failure when the number is negative? (Choose all that apply.)

A. assert n < 0: "OhNo";
B. assert n < 0, "OhNo";
C. assert n < 0 ("OhNo");
D. assert(n < 0): "OhNo";
E. assert(n < 0, "OhNo");

65. What is the output of the following code?

```
LocalDate date = LocalDate.of(2018, Month.APRIL, 30);
date.plusDays(2);
date.plusYears(3);
System.out.println(date.getYear() + " "
   + date.getMonth() + " "+ date.getDayOfMonth());
```

A. 2018 APRIL 2
B. 2018 APRIL 30
C. 2018 MAY 2
D. 2021 APRIL 2
E. 2021 APRIL 30
F. 2021 MAY 2
G. A runtime exception is thrown.

66. What are the requirements for a class that you want to serialize with ObjectOutputStream? (Choose all that apply.)

A. The class must implement the Serializable interface.
B. The class must extend the Serializable class.
C. The class must declare a static serialVersionUID variable.
D. All instance members of the class must be Serializable.
E. All instance members of the class must be marked transient.
F. Any class can be serialized with ObjectOutputStream.

67. What are some advantages of using Files.lines() over Files.readAllLines()? (Choose all that apply.)

A. It is often faster.
B. It can be run on large files with very little memory available.
C. It can be chained with stream methods directly.
D. It does not modify the contents of the file.
E. It ensures the file is not read-locked by the file system.
F. There are no differences, because one method is a pointer to the other.

68. Which of the options can fill in the blanks in order to make the code compile?

```
boolean bool = stmt.________(sql);
int num = stmt._________ (sql);
ResultSet rs = stmt._________ (sql);
```

A. execute, executeQuery, executeUpdate
B. execute, executeUpdate, executeQuery
C. executeQuery, execute, executeUpdate
D. executeQuery, executeUpdate, execute

E. executeUpdate, execute, executeQuery
F. executeUpdate, executeQuery, execute

69. Assuming MyTask is an abstract class that implements the ForkJoinTask interface, what statements about the following code are true? (Choose all that apply.)

```
import java.util.concurrent.*;
public class FindMin extends MyTask {
   private Integer[] elements;
   private int a;
   private int b;
   public FindMin(Integer[] elements, int a, int b) {
      this.elements = elements;
      this.a = a;
      this.b = b;
   }
   public Integer compute() {
      if ((b—a) < 2)
         return Math.min(elements[a], elements[b]);
      else {
         int m = a + ((b—a) / 2);
         System.out.println(a + "," + m + "," + b);
         MyTask t1 = new FindMin(elements, a, m);
         int result = t1.fork().join();
         return Math.min(new FindMin(elements, m, b).compute(),
result);
      }
   }

   public static void main(String[] args) throws
InterruptedException,

ExecutionException {
      Integer[] elements = new Integer[] { 8, -3, 2, -54 };
      MyTask task = new FindMin(elements, 0, elements.length—1);
      ForkJoinPool pool = new ForkJoinPool(1);
      Integer sum = pool.invoke(task);
      System.out.println("Min: " + sum);
   }
}
```

A. The code correctly finds the minimum value in the array.
B. MyTask inherits RecursiveAction.
C. MyTask inherits RecursiveTask.
D. The code produces a ForkJoinPool at runtime.
E. The class produces single-threaded performance at runtime.
F. The code does not compile.