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# Collections and Generics

#### Q: 01 Given:

- 34. HashMap props = new HashMap();
- 35. props.put("key45", "some value");
- 36. props.put("key12", "some other value");
- 37. props.put("key39", "yet another value");
- 38. Set s = props.keySet();
- 39. // insert code here

#### What, inserted at line 39, will sort the keys in the props HashMap?

```
A. Arrays.sort(s);B. s = new TreeSet(s);C. Collections.sort(s);D. s = new SortedSet(s);
```

Answer: B

#### Q: 02 Click the Exhibit button.

#### Which statement is true about the set variable on line 12?

- A. The set variable contains all six elements from the coll collection, and the order is guaranteed to be preserved.
- B. The set variable contains only three elements from the coll collection, and the order is guaranteed to be preserved.
- C. The set variable contains all six elements from the coll collection, but the order is NOT guaranteed to be preserved.
- D. The set variable contains only three elements from the coll collection, but the order is NOT guaranteed to be preserved.

Answer: D

# 23. Object [] myObjects = { 24. new Integer(12), 25. new String("foo"), 26. new Integer(5), 27. new Boolean(true) 28. }; 29. Arrays.sort(myObjects); 30. for(int i=0; i<myObjects.length; i++) { 31. System.out.print(myObjects[i].toString()); 32. System.out.print(" "); 33. }

#### What is the result?

Q: 03 Given:

- A. Compilation fails due to an error in line 23.
- B. Compilation fails due to an error in line 29.
- C. A ClassCastException occurs in line 29.
- D. A ClassCastException occurs in line 31.
- E. The value of all four objects prints in natural order.

**Answer: C** 

#### Q: 04 Click the Task button.

```
Place code into the class so that it compiles and generates the output
answer=42. Note: Code options may be used more than once.
Class
public class Place here {
                                                            Code Options
  private Placehere object;
                                                               Gen(T)
  public Place here (Place here object) {
     this object = object;
                                                               Gen(?)
  public Place here getObject() {
                                                                 Gen
    return object;
  public static void main(String[] args) {
    Gen(String) str = new Gen(String)("answer");
Gen(Integer) intg = new Gen(Integer)(42);
    System.out.println(str.getObject() + "=" +
          intg.getObject());
                                                                 Done
```

#### Solution:

```
1.Gen<T>
```

**2.T** 

3.Gen

4.T

5.T

#### Q: 05 Click the Task button.

```
Given:

public void takeList(List(? extends String) list) {

    // insert code here
}

Place the Compilation Results on each code statement to indicate whether or not that code will compile if inserted into the takeList() method.

Code Statements

    list add("Foo");

    list = new ArrayList(String)();

    list = new ArrayList(Object)();

    String s = list.get(0);

    Object o = list;

Compilation Results

    Compilation succeeds

    Compilation fails
```

#### Solution:

```
    list.add("foo"); ------ Compilation fails
    list = new ArrayList<String>(); ----- Compilation succeeds
    list=new ArrayList<Object>(); ---- Compilation fails
    String s = list.get(0); ----- Compilation succeeds
    Object o = list; ---- Compilation succeeds
    Q: 06 Given:
    public class Person {
    private String name;
    public Person(String name) { this.name = name; }
    public boolean equals(Person p) {
    return p.name.equals(this.name);
    }
    }
```

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#### Which statement is true?

- A. The equals method does NOT properly override the Object.equals method.
- B. Compilation fails because the private attribute p.name cannot be accessed in line 5.
- C. To work correctly with hash-based data structures, this class must also implement the hashCode method.
- D. When adding Person objects to a java.util.Set collection, the equals method in line 4 will prevent duplicates.

Answer: A

#### Q: 07 Given:

```
1. import java.util.*;
2. public class Old {
3. public static Object get0(List list) {
4. return list.get(0);
5. }
6. }
```

#### Which three will compile successfully? (Choose three.)

```
A. Object o = Old.get0(new LinkedList());
B. Object o = Old.get0(new LinkedList<?>());
C. String s = Old.get0(new LinkedList<String>());
D. Object o = Old.get0(new LinkedList<Object>());
E. String s = (String)Old.get0(new LinkedList<String>());
```

Answer: A, D, E

# Q: 08 Given: 1. import java.util.\*; 2. public class Example { 3. public static void main(String[] args) { 4. // insert code here 5. set.add(new Integer(2)); set.add(new Integer(1)); 7. System.out.println(set); 8. } 9.} Which code, inserted at line 4, guarantees that this program will output [1, 2]? A. Set set = new TreeSet(); B. Set set = new HashSet(); C. Set set = new SortedSet(); utorials D. List set = new SortedList(); E. Set set = new LinkedHashSet(); Answer: A Q: 09 Given: 11. public static Collection get() { 12. Collection sorted = new LinkedList(); 13. sorted.add("B"); sorted.add("C"); sorted.add("A"); 14. return sorted; **15.** } 16. public static void main(String[] args) { 17. for (Object obj: get()) { 18. System.out.print(obj + ", ");

19. } 20. }

#### What is the result?

A. A, B, C,

B. B. C. A.

- C. Compilation fails.
- D. The code runs with no output.
- E. An exception is thrown at runtime.

#### Answer: B

#### Q:10 given

#### Click the Task button.

Place the correct description of the compiler output on the code fragments to be inserted at lines 4 and 5. The same compiler output may be used more than once.

#### Code

```
ArrayList<String> x1 = new ArrayList<String>();
foo(x1);

ArrayList<Object> x2 = new ArrayList<String>();
foo(x2);

ArrayList<Object> x3 = new ArrayList<Object>();
foo(x3);

ArrayList x4 = new ArrayList();
foo(x4);
```

#### Compiler Output

```
Compilation succeeds.

Compilation fails due to an error in the first statement.

Compilation of the first statement succeeds, but compilation fails due to an error in the second statement.
```

Done

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#### Solution:

Compilation of the first statement succeeds ,but compilation fails due to an error in the second statement.

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- 1. Compilation fails due to an error in the first statement
- 2. Compilation succeeds
  - 4. Compilation succeeds

#### **Q: 11 Given:**

```
11. public static Iterator reverse(List list) {
12. Collections.reverse(list);
13. return list.iterator();
14. }
15. public static void main(String[] args) {
16. List list = new ArrayList();
17. list.add("1"); list.add("2"); list.add("3");
18. for (Object obj: reverse(list))
19. System.out.print(obj + ", ");
20. }
```

#### What is the result?

A. 3, 2, 1,

B. B. 1, 2, 3,

- C. Compilation fails.
- D. The code runs with no output.
- E. An exception is thrown at runtime.

**Answer: C** 

#### Q: 12 Click the Task button

```
Given:

    import java.util.*;

   2. class A { }
3. class B extends A { }

 public class Test {

         public static void main(String[] args) {
   List<A> listA = new LinkedList<A>();
   List<B> listB = new LinkedList<B>();
   6.
   7.
   8.
            List(Object) listO = new LinkedList(Object)();
            // insert code here
 10.
  11.
         public static void m1(List<? extends A> list) { }
 12.
13. }
         public static void m2(List(A) list) { }
Place a result onto each method call to indicate what would happen if the method call
were inserted at line 9. Note: Results can be used more than once.
                       Method Calls
                                                                           Result
        m1(listA);
                                      m2(listA);
                                                                       Does not compile.
        m1(listB);
                                      m2(listB);
                                                                  Compiles and runs without error
        m1(list0)
                                      m2(list0);
                                                                 An exception is thrown at runtime.
```

======does not compile=======

```
1.m1(listO);
2.m2(listB);
3.m2(listO);
====compiles and runs with out error=======
1.m1(listA);
2.m1(listB);
3.m2(listA);
```

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#### Q: 13 Given:

```
    import java.util.*;
    public class PQ {
    public static void main(String[] args) {
    PriorityQueue<String> pq = new PriorityQueue<String>();
    pq.add("carrot");
    pq.add("apple");
    pq.add("banana");
    System.out.println(pq.poll() + ":" + pq.peek());
    }
    }
```

#### What is the result?

- A. apple:apple
- B. carrot:apple
- C. apple:banana
- D. banana:apple
- E. carrot:carrot
- F. carrot:banana

#### **Answer: C**

#### Q: 14 Given:

```
    import java.util.*;
    public class WrappedString {
    private String s;
    public WrappedString(String s) { this.s = s; }
    public static void main(String[] args) {
    HashSet<Object> hs = new HashSet<Object>();
    WrappedString ws1 = new WrappedString("aardvark");
    WrappedString ws2 = new WrappedString("aardvark");
    String s1 = new String("aardvark");
    String s2 = new String("aardvark");
    hs.add(ws1); hs.add(ws2); hs.add(s1); hs.add(s2);
    System.out.println(hs.size()); }
```

#### What is the result?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4
- F. Compilation fails.
- G. An exception is thrown at runtime.

Answer: D

Q: 15 Given:

- 11. public class Key {
- 12. private long id1;
- 13. private long id2;
- 14.
- 15. // class Key methods

16.}

A programmer is developing a class Key, that will be used as a key in a standard java.util.HashMap.Which two methods should be overridden to assure that Key works correctly as a key? (Choose two.)

- A. public int hashCode()
- B. public boolean equals(Key k)
- C. public int compareTo(Object o)
- D. public boolean equals(Object o)
- E. public boolean compareTo(Key k)

Answer: A, D

```
Q: 16 Given a pre-generics implementation of a method:
11. public static int sum(List list) {
12. int sum = 0;
13. for ( Iterator iter = list.iterator(); iter.hasNext(); ) {
14. int i = ((Integer)iter.next()).intValue();
15. sum += i;
16.}
17. return sum;
18.}
Which three changes must be made to the method sum to use generics?
(Choose three.)
A. remove line 14
B. replace line 14 with "int i = iter.next();"
C. replace line 13 with "for (int i: intList) {"
D. replace line 13 with "for (Iterator iter: intList) {"
E. replace the method declaration with "sum(List<int> intList)"
F. replace the method declaration with "sum(List<Integer> intList)"
Answer: A, C, F
Q: 17 Given:
11. // insert code here
12. private N min, max;
13. public N getMin() { return min; }
14. public N getMax() { return max; }
15. public void add(N added) {
16. if (min == null || added.doubleValue() < min.doubleValue()) 17. min = added;
18. if (max == null || added.doubleValue() > max.doubleValue()) 19. max =
added;
20. }
21.}
```

#### Which two, inserted at line 11, will allow the code to compile? (Choose two.)

```
A. public class MinMax<?> {
B. public class MinMax<? extends Number> {
C. public class MinMax<N extends Object> {
D. public class MinMax<N extends Number> {
E. public class MinMax<? extends Object> {
F. public class MinMax<N extends Integer> {
Answer: D, F
Q: 18 Given:
1. import java.util.*;
2.
3. public class LetterASort{
4. public static void main(String[] args) {
5. ArrayList<String> strings = new ArrayList<String>();
6. strings.add("aAaA");
7. strings.add("AaA");
8. strings.add("aAa");
9. strings.add("AAaa");
10. Collections.sort(strings);
11. for (String s : strings) { System.out.print(s + " "); }
12. }
13. }
What is the result?
A. Compilation fails.
B. aAaA aAa AAaa AaA
C. AAaa AaA aAa aAaA
D. AaA AAaa aAaA aAa
E. aAa AaA aAaA AAaa
```

**Answer: C** 

F. An exception is thrown at runtime.

#### Q: 19 Click the Task button.

```
Given: NumberNames nn = new NumberNames();
      nn.put("one", 1);
      System.out.println(nn.getNames());
Place the code into position to create a class that maps from Strings to integer values.
The result of execution must be [one]. Some options may be used more than once.
      public class NumberNames {
         private HashMap
                              Place here
                                               Place here
                                                           > map =
             new HashMap<
                              Place here
                                               Place here
                                                              Place here
         public void put(String name, int value) {
           map.put( Place here
                                        Place here
         }
         public
                                          getNames() {
                         Place here
           return map.keySet();
      }
Code
                              Set (Integer
                                                          HashSet
 Set (Integer String)
                                      String:
                                                       (String, Integer
   Set<String
                               Set(String)
                                                        NumberNames
                int
   String
                  Integer
                                   int
                                                                  Done
                                 value
                   name
                                                  map
```

#### Solution:

```
public class NumberNames{
    private HashMap< String , Integer> map=
    new HashMap< String , Integer >( );
    public void put(String name . int Value) {
        map.put(name , Value);
    }
    public Set<String> getNames() {
        return map.keySet();
    }
}
```

# Q: 20 Which two statements are true about the hashCode method? (Choose two.)

- A. The hashCode method for a given class can be used to test for object equality and object inequality for that class.
- B. The hashCode method is used by the java.util.SortedSet collection class to order the elements within that set.
- C. The hashCode method for a given class can be used to test for object inequality, but NOT object equality, for that class.
- D. The only important characteristic of the values returned by a hashCode method is that the distribution of values must follow a Gaussian distribution.
- E. The hashCode method is used by the java.util.HashSet collection class to group the elements within that set into hash buckets for swift retrieval.

Answer: C, E

Q: 22 A programmer has an algorithm that requires a java.util.List that provides an efficient implementation of add(0, object), but does NOT need to support quick random access.

#### What supports these requirements?

A. java.util.Queue

B. java.util.ArrayList

C. java.util.LinearList

D. java.util.LinkedList

Answer: D

#### Q: 24 Given:

```
10. interface A { void x(); }
11. class B implements A { public void x() {} public void y() {} }
12. class C extends B { public void x() {} }
And:
20. java.util.List<A> list = new java.util.ArrayList<A>();
21. list.add(new B());
22. list.add(new C());
23. for (A a : list) {
24. a.x();
25. a.y();
26. }
```

#### What is the result?

- A. The code runs with no output.
- B. An exception is thrown at runtime.
- C. Compilation fails because of an error in line 20.
- D. Compilation fails because of an error in line 21.
- E. Compilation fails because of an error in line 23.
- F. Compilation fails because of an error in line 25.

Answer: F

#### Q: 26 Given:

import java.util.\*;

Place the correct description of the compiler output on the code fragments to be at lines 4 and 5. The same compiler output may be used more than once.

```
2. public class X {
3.
     public static void main(String[] args) {
4 .
        // insert code here
5.
        // insert code here
6.
7.
     public static void foo(List(Object) list) {
8.
      } }
Code
  ArrayList(String) x1 = new ArrayList(String)();
  foo(x1);
  ArrayList(Object) x2 = new ArrayList(String)();
  foo(x2);
```

```
ArrayList(Object) x3 = new ArrayList(Object)();
foo(x3);

ArrayList x4 = new ArrayList();
```

ArrayList x4 = new ArrayList(); foo(x4);

## Compiler Output

Compilation succeeds.

Compilation fails due to an error in the first statement.

Compilation of the first statement succeeds, but compilation fails due to an error in the second statement.

#### Solution:

- 1. Compilation of the first statement succeeds ,but compilation fails due to an error in the second statement.
- 2. Compilation fails due to an error in the first statement
- 3. Compilation succeeds
- 4. Compilation succeeds

#### Q: 26 Click the Task button.

```
Given:

public void takeList(List<? extends String> list) {

    // insert code here
}

Place the Compilation Results on each code statement to indicate where
or not that code will compile if inserted into the takeList() method.

Code Statements

    list.add("Foo");

    list = new ArrayList<String>();

    list = new ArrayList<Object>();

    String s = list.get(0);

    Object o = list;

Compilation Results

Compilation succeeds

Compilation fails
```

#### Solution:

```
1. list.add("foo"); ----- Compilation fails
                                 -----Compilation succeeds
2. list = new ArrayList<String>();
3.list=new ArrayList<Object>(); ---- Compilation fails
4. String s = list.get(0); ----- Compilation succeeds
5. Object o = list: ---- Compilation succeeds
Q: 27 Given:
1. public class Drink implements Comparable {
2. public String name:
3. public int compareTo(Object o) {
4. return 0;
5.}
6. }
                                utorials
and:
20. Drink one = new Drink();
21. Drink two = new Drink();
22. one.name= "Coffee";
23. two.name= "Tea";
23. TreeSet set = new TreeSet();
24. set.add(one);
25. set.add(two);
```

A programmer iterates over the TreeSet and prints the name of each Drink object.

#### What is the result?

- A. Tea
- B. Coffee
- C. Coffee Tea
- D. Compilation fails.
- E. The code runs with no output.
- F. An exception is thrown at runtime.

#### Answer: B

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