University Interscholastic League

Computer Science Competition 2003-04

JAVA PRACTICE QUESTIONS – SET 1

- Remember that calculators are NOT permitted for this year's contests.

QUESTION 1

How many bits are in the Java type `char`?

A. `4` B. `8` C. `16` D. `32` E. Implementation dependent

QUESTION 2

Which of the following declares that variable `b` has the type `Book` and holds *The Gunslinger*, the first book in Stephen King's *Dark Tower* series?

A.
```
Book b = new Book("The Gunslinger",
                  "Stephen King", "Dark Tower");
```
B.
```
Book b = Book("The Gunslinger",
                  "Stephen King", "Dark Tower");
```
C.
```
Book b = ("The Gunslinger", "Stephen King",
                                  "Dark Tower");
```
D.
```
Book b ("The Gunslinger", "Stephen King",
                                  "Dark Tower");
```
E. More than one of these

QUESTION 3

The `Book` class has a public method called `setNext()` which has a `Book` parameter and sets the `nextInSeries` field to that parameter if both books are in the same series. Which of the following correctly implements `setNext()`?

A.
```
public void setNext(Book b) {
  this.nextInSeries = new Book(b);
}
```
B.
```
public void setNext(Book b) {
  if (series.equals(b.series))
    nextInSeries = b;
}
```
C.
```
public void setNext(Book b) {
  if (this.series=b.series)
    this.nextInSeries = b;
}
```
D.
```
public void setNext(Book b) {
  if (this.series==b.series)
    this.nextInSeries = b;
}
```
E. None of these

```
public class Book {

  public Book(String t, String a,
                        String s) {
    title=t; author=a; series=s;
  }

  // methods omitted

  private String title, author,
                              series;
  private Book nextInSeries;
}
```

QUESTION 4

What package must be imported to use the classes `BufferedReader` and `InputStreamReader` without preceding them by their package name?

A. `java.lang` B. `java.io` C. `java.math`
D. `java.awt` E. None of these

QUESTION 5

What is output by the code to the right on this input?

```
10
3
4
-2
3
```

A. `17` B. `15`
C. `18` D. `0`
E. None of these

```
int input=0, sum=0;
BufferedReader keyboard =
  new BufferedReader(
    new InputStreamReader(
      System.in));

try {
  while (input>=0) {
    input = Integer.parseInt(
            keyboard.readLine());
    sum+=input;
  }
}
catch (IOException e) {}

System.out.print(sum);
```

QUESTION 6

Which of the following declares `PI` to be a class constant that is accessible to all other classes?

A. `PI = 4 * Math.atan(1);`
B. `public final PI = 4 * Math.atan(1);`
C. `public static PI = 4 * Math.atan(1);`
D. `public static final PI = 4 * Math.atan(1);`
E. None of these

QUESTION 7

Suppose that `Shape` is an abstract class, that `Polygon` is a class that extends `Shape`, and that `Square` is a class that extends `Polygon`. Given the following declaration, which of these is true?

```
Square s = new Square();
```

A. `s instanceof Object` B. `s instanceof Shape` C. `s instanceof Polygon`
D. `s instanceof Square` E. All of these

QUESTION 8

What is output by the function call `outputSum(3,4)`?

A. `3+4=7` B. `3 + 4 = 7` C. `3+4=34`
D. Syntax error in function E. None of these

```
public static void outputSum
                  (int i, int j) {
  System.out.print(i + "+" + j +
                   "=" + (i+j));
}
```

QUESTION 9

Which of the following declares an array of integers which holds the squares of the first ten integers?

A. `int[] squares = new int[] {1, 4, 9, 16, 25, 36, 49, 64, 81, 100};`

B. `int[10] squares = {1, 4, 9, 16, 25, 36, 49, 64, 81, 100};`

C. `int squares = {1, 4, 9, 16, 25, 36, 49, 64, 81, 100};`

D. `int[] squares = new int {1, 4, 9, 16, 25, 36, 49, 64, 81, 100};`

E. More that one of these

QUESTION 10

Which of the following throws an `IllegalArgumentException` if `int x` is not positive?

A. `if (x<0) throw IllegalArgumentException("Argument must be positive");`

B. `if (x<=0) throw IllegalArgumentException("Argument must be positive");`

C. `if (x<0) throw new IllegalArgumentException("Argument must be positive");`

D. `if (x<=0) throw new IllegalArgumentException("Argument must be positive");`

E. None of these

QUESTION 11

$11001111_2 + 1101001_2 =$

A. 470_8 B. 468_8 C. 367_8 D. 312_8 E. None of these

QUESTION 12

What is the value of this expression?

```
85/7*7+85%7
```

A. 7 B. 85 C. 86 D. 96 E. None of these

QUESTION 13

Which of the following replaces **<*1>** in the code to the right to call the constructor for the `Parent` class with the parameter `x`?

A. `Parent(x);` B. `super(x);` C. `x.super();`

D. `this(x);` E. None of these

```
public class Child extends Parent{

  public Child(int x, int y) {
    <*1>
    // initialization with
    // y omitted
  }

  // rest of class omitted
}
```

QUESTION 14

Which of these is a correct call to search attempting to locate an element with the value `5` in an array `A` with length `14`?

A. `A.search(5)`
B. `A.search(14,5)`
C. `ArrayTools.search(A,14)`
D. `ArrayTools.search(A,5)`
E. None of these

QUESTION 15

In the search above, if `A[7]` is `5`, and `5` does not appear anywhere else in `A`, how many times will an element of `A` be compared with the value `5` before returning an answer?

A. `0` B. `14` C. `7`
D. `8` E. None of these

```
public class ArrayTools {

  public static int search
                (int[] v, int z) {
    int i;
    for(i=0; i<v.length; ++i)
      if(v[i]==z) break;
    if (i==v.length) i=-1;
    return i;
  }

  // rest of class omitted
}
```

QUESTION 16

For the function to the right to implement the Merge Sort algorithm, what must the function `Merge()` do?

A. Nothing; it shouldn't be there
B. Sort `A`
C. Combine the unsorted list stored in the front half of `A` with the unsorted list in the back half of `A`
D. Combine the sorted list stored in the front half of `A` with the sorted list in the back half of `A`
E. None of these

QUESTION 17

Assume that `Merge()` is correctly and efficiently implented. What is the worst case running time of `MergeSort(A)`, where `n` is the length of array `A`? Choose the smallest correct answer.

A. O(log `n`) B. O(`n`) C. O(`n` log `n`)
D. O(n^2) E. None of these

```
public static void Mergesort
                (Comparable[] A) {
  MergeSort(A, 0, A.length);
}

public static void MergeSort
    (Comparable[] A, int front,
                     int back) {
  int mid=(front+back)/2;
  if (mid==front) return;
  MergeSort(A,front,mid);
  MergeSort(A,mid,back);
  Merge(A,front,back);
}
```

QUESTION 18

What is returned by the function call `f(100)`?

A. `1` B. `100` C. `10000`

D. Exception thrown E. None of these

```
public static int f(int x) {
  if (x<=0) return 0;
  else return 1+f(x-1);
}
```

QUESTION 19

What is returned by `process(A)` for array `A` given below?

2	0	3	3	5	-4	12	7	3	3

A. `0` B. `4` C. `5`

D. Exception thrown E. None of these

```
public static int process(int[] A)
{
  int count;
  for (int i=0; i<A.length; ++i)
    if(A[i]>=0 & A[i]<=A.length
               & A[A[i]]==3)
      ++count;
  return count;
}
```

QUESTION 20

What happens when a constructor is not defined for a user-defined class?

A. You cannot instantiate the class.

B. There is a default constructor, which takes arguments of the same type as the data members in order.

C. There is a default constructor which initializes data members that have basic types to `false` or `0` and reference types to `null`.

D. There is a default constructor which does not initialize the data members.

E. None of these.

Computer Science Answer Key
Java Practice Questions Set 1

1.	C	11.	A
2.	A	12.	B
3.	B	13.	B
4.	B	14.	D
5.	B	15.	D
6.	D	16.	D
7.	E	17.	C
8.	A	18.	B
9.	A	19.	D
10.	D	20.	C