Code Analysis

Camas Invite 2020

You are permitted either one 8.5 by 11 inch, double-sided reference sheet or two 8.5 by 11 inch, single-sided reference sheets. You are also permitted to have **blank** scratch paper to he keep track of your work.

You are not permitted to use any other resources, including computers (beyond the scope of taking the test), calculators, or cell phones.

You are required to stay in the test tab until you submit the test for grading!

Time spent outside of the test window will be closely monitored and will be subject to scrutiny. Do not open any other tabs, check your email, or perform any other actions on your comp until you have completed and submitted your test. Failure to follow this rule will result in investigation and possible disqualification from the event.

This test is composed of four sections.

Section 1: Snippets (32 points)

Section 2: Troubleshooting (40 points)

Section 3: Large Code 1 (20 points)

Section 4: Large Code 2 (16 points)

Total: 108 points

Section 1: Snippets

For the code snippets below, determine the resulting output. Each problem is worth 4 points.

1. (4.00 pts)

```
public class One {
    public static void main(String args[]) {
        int j = 10;
        for (int i = 0; i <= 9; i++)
            j=(j+3*i/2)/3;
        System.out.println(j);
    }
}
```

Expected Answer: 6 No partial credit

2. (4.00 pts)

```
public class Two {
    public static void main(String args[]) {
        double j = 5;
        for (int i = 0; i < 7; i++)
            j = i%2==0&&j<=10 ? j+i/2 : j-i/3;
    System.out.println(j);
    }
}
```

Expected Answer: 9.0 2 points if they have 9 instead of 9.0

3. (4.00 pts)

```
public class Three {
    public static void main(String args[]) {
        int a = 8;
        int b = 6;
        System.out.print(a<<(~b+a<<1));
    }
}
```

Expected Answer: 32 No partial credit

4. (4.00 pts)

```
public class Four {
    public static void main(String args[]) {
        for (int i = 1; i <= 10; i++)
            if (((i % 5) == 0) || ((i % 4) == 0))
                System.out.print("A");
            else if ((i % 3) == 0)
                System.out.print("B");
            else if ((i % 2) == 0)
                System.out.print("C");
            else
                System.out.print("D");
    }
}
```

Expected Answer: DCBAABDABA 0.4 points per correct letter, point total rounded down to a whole number

5. (4.00 pts)

```
public class Five {
    public static void main(String args[]) {
        int[] A = {1,3,2,1,0,1};
        String B = "SciOly";
        for(int i = 0; i <= 5; i++)
            System.out.print(B.substring(i,i+A[i]));
    }
}
```

Expected Answer: SciOiOOy 2 points for the correct letters 2 points for the correct capitalization

6. (4.00 pts)

```
public class Six {
    public static void main(String args[]) {
        int i = 0;
        int j = 's';
        while((i + j)/2 < 'Z')
            i++;
        System.out.print((char) i);
    }
}
```

Expected Answer: A No partial credit

7. (4.00 pts)

```
public class Seven {
    public static void main(String args[]) {
        String string = "Strings are things";
        int i = string.indexOf("ing");
        int j = string.lastIndexOf("ing");
        System.out.println(string.substring(i,j));
    }
}
```

Expected Answer: ings are th No partial credit

8. (4.00 pts)

```
public class Eight {
    public static void main(String args[]) {
        int x = 2;
        int y = 3;
        while(x < y) {
            x = 2*(x+1);
            y = y + 7;
        }
        System.out.println(x);
        System.out.println(y);
    }
}
```

Expected Answer: 30 24 2 points per correct number

Section 2: Troubleshooting

For each snippet of code below, determine if there is an error that will prevent the code from running. If there is an error, enter what line the error is on (1 point), describe concisely and specifically why the code does not run properly (2 points), and describe how to correct it (2 points). If there is no error, simply write “no error”. You do not need to write the output of the code.

9. (5.00 pts)

```
1  public class One {
2      public static void main(String args[]) {
3          double j = 10;
4          boolean i = true;
5          int k = -5;
6          System.out.println((int) j + (int) i + (int) k);
7      }
8  }
```

Expected Answer: Error on line 6 (1 point) Boolean cannot be typecast into int. (2 points) Solution must manually convert the Boolean (2 points, do not need to write code to do this) or remove it from the print statement (1 point)

10. (5.00 pts)

```
1  public class Two {
2      public static void main(String args[]) {
3          int x = 3.0 > 2.0 ?int(2.0) : 3;
4          System.out.print(x);
5      }
6  }
```

Expected Answer: Error on line 3. (1 point) Wrong syntax for typecasting. (2 points) Correct version is (int) 2.0 (2 points)

11. (5.00 pts)

```
1  public class Three {
2      public static void main(String args[]) {
3          int i = 2;
4          int[] j = new int[1];
5          j += i;
6      }
7  }
```

Expected Answer: Error on line 5. (1 point) Can't add an array (even of size 1) to a non-array (2 points) Correct version is j[0] (2 points)

12. (5.00 pts)

```
1  public class Four {
2      public Static Void Main(String args[]) {
3          int x = 0;
4          int y = 2;
5          int z = 5;
6          while(x+y+z < y*z){
7              x = y;
8              y++;
9          }
10     }
11 }
```

Expected Answer: Error on line 2 (1 point) Static can't be uppercase (2 points) Correct version is public static Void Main(String args[]) { (2 points)

13. (5.00 pts)

```
1  public class Five {
2      public static void main(String args[]) {
3          double[] array[] = {{1,2},{3,4},{5,6}};
4          for (int i=0 ; i<(array.length) ; i++ ) {
5              for (int j=0 ; j<array[i].length ; j++)
6                  System.out.println(array[i,j]);
7          }
8      }
9  }
```

Expected Answer: Error on line 6. (1 point) Incorrect syntax to retrieve array elements. (2 points) Correct version array[i][j] (2 points)

14. (5.00 pts)

```
1  public class Six {
2      public static void main(String args[]) {
3          String string = "Lemony Snicket";
4          if (string.charAt(string.length()- 5) == 'c'){
5              System.out.print("true");
6          }
7      }
8  }
```

Expected Answer: No issue. (5 points) Code will not output anything since the statement is false (would be true if it was -4). However, this does not prevent the code from running, so it does not count per the listed instructions.

15. (5.00 pts)

```
1  public class Seven {
2      public static void main(String args[]) {
3          String s = "\\\'\\\"\\";
4          System.out.printf(%%%s,s);
5      }
6  }
```

Expected Answer: Error on line 4 (1 point) Printf missing quotes. (2 points) Correct version “%%%s” (2 points)

16. (5.00 pts)

```
1  public class Eight {
2      public static void main(String args[]) {
3          double k = 5;
4          for (int i = 0; i <= 6; i++){
5              k += --k- --k+-k++;
6          }
7      System.out.println(k);
8      }
9  }
```

Expected Answer: No issue. (5 points)

Section 3 – Large Code 1

Analyze the large section of code below and determine the output. (20 points)

17. (20.00 pts)

```
public class BigOne {
    static void functionOne(int arr[][]){
        int[][] arr2 = new int[2][5];
        int k1 = 0;
        int k2 = 0;
        for(int i = 0; i < 2; i++){
            for(int j = 0; j < 5; j++){
                int a = arr[i][j];
                if(a%2==0){
                    arr2[0][k1] = a;
                    k1++;
                }
                else{
                    arr2[1][k2] = a;
                    k2++;
                }

            }
        }
        functionThree(arr2);
        functionTwo(arr2);
    }
    static void functionTwo(int arr[][]){
        int[][] arr2 = new int[2][5];
        boolean flag = false;
        for(int i = 0; i < 4; i++){
            if(arr2[0][i]==0){
                if(arr[0][i]%10>arr[0][i+1]%10){
                    flag = true;
                    arr2[0][i] = arr[0][i];
                }
                else{
                    arr2[0][i] = arr[0][i+1];
                    arr2[0][i+1] = arr[0][i];
                }
            }
        }
        if(arr2[0][4]==0){
                arr2[0][4] = arr[0][4];
        }
        for(int j = 0; j < 4; j++){
            if(arr2[1][j]==0){
                if(arr[1][j]%9>arr[1][j+1]%9){
                    flag = true;
                    arr2[1][j] = arr[1][j];
                }
                else{
                    arr2[1][j] = arr[1][j+1];
                    arr2[1][j+1] = arr[1][j];
                }
            }
        }
        if(arr2[0][4]==0){
                arr2[0][4] = arr[0][4];
        }
        if(flag){
            functionTwo(arr2);
        }
        else{
            functionThree(arr2);
        }
    }
    static void functionThree(int arr[][]){
        for(int i = 0; i < 2; i++){
            for(int j = 0; j < 5; j++){
                System.out.print(arr[i][j] + " ");
            }
        }
        System.out.println("");
    }
    public static void main(String args[]){
        int arr[][] = {{28, 1, 17, 10, 5},{13, 2, 26, 15, 24}};
        functionOne(arr);
```

```
    }
}
```

Expected Answer: 28 10 2 26 24 1 17 5 13 15 28 26 24 2 10 17 5 15 13 1 (1 points per correct number)

Section 4 – Large Code 2

Analyze the large section of code below and determine the output. Both "flag" and "add" can be accessed by any function (do not worry about variable scope) (16 points)

18. (16.00 pts)

```
public class BigTwo{
    public static boolean flag = false; //This can be used and modified by any function
    public static int add = 0; //This can be used and modified by any function

    public static boolean functionOne(){
        if(flag){
            flag = false;
            return(flag);
        }
        else{
            flag = true;
            return(!flag);
        }
    }

    public static void functionTwo(int a){
        if(a%2 == 0){
            functionOne();
            add += 3;
        }
        if(a%3 == 0){
            add += 1;
            if(functionOne() == flag){
                add += 2;
            }
        }
        if(a%5 == 0){
            add += 2;
            if(functionOne() || flag){
                add += 2;
            }
        }
        functionThree(a);
    }

    public static void functionThree(int a){
        System.out.print(a+add);
        System.out.print(" ");
        System.out.println(flag);
    }

    public static void main(String args[]){
         int arr[] = {7, 25, 21, 16, 45, 20, 36, 30};
         for(int i = 0; i < arr.length; i++){
             flag = false;
             add = 0;
             functionTwo(arr[i]);
         }
    }
}
```

Expected Answer: 7 false 29 true 22 true 19 true 48 false 25 false 42 false 40 true (1 point for each correct entry)

Please carefully check over you answers and ensure that you have correctly addressed each question if you have time remaining. Partial credit will be given where appropriate.