

Write all of your responses on these exam pages.

1 Short Answer (5 Points Each)

1. What are the three types of programming errors? Briefly describe each of them.
2. Answer the following questions about numeric data types in Java.
 - (a) What happens when you overload an int?
 - (b) What happens when you overload a double?
 - (c) What happens when you underload an int?
 - (d) What happens when you underload a double?
 - (e) What happens when you input a non-numeric string when the Scanner is doing a nextDouble?

3. What is the difference between a compiler and an interpreter? Also, discuss Java's method. In addition, explain why this makes Java a "platform-independent language."

4. What does ASCII stand for and what is it?

5. Which of the following are valid variable names. If the variable name is invalid state why.

(a) `if`

(b) `3blindmice`

(c) `GeorgeForman`

(d) `Tax$`

(e) `Bus_Stop`

6. Write a single line of code that will compute $\sqrt{2 + \sqrt{2}}$ and store the value in the variable `S`.

7. Convert the number 279 into binary.

2 Program Traces (15 Points Each)

1. For each of the given inputs, write the output of the program.

```
1 import java.util.Scanner;
2
3 public class Exam01Trace01 {
4
5     public static void main(String[] args) {
6         Scanner keyboard = new Scanner(System.in);
7
8         System.out.print("Input x: ");
9         int x = keyboard.nextInt();
10        System.out.print("Input y: ");
11        int y = keyboard.nextInt();
12        System.out.print("Input z: ");
13        double z = keyboard.nextDouble();
14
15        double w = y / x;
16        long t = y % x;
17        ++y;
18        int u = y + x--;
19        double r = z / x + y;
20
21        System.out.println(x + " " + y + " " + z);
22        System.out.println(w + " " + t + " " + u + " " + r);
23    }
24 }
```

- (a) Input x: 5
Input y: 21
Input z: 4.5

-
- (b) Input x: 5
Input y: 3
Input z: 2

2. For the given input, write the output of the program. For any spaces, including leading or trailing, use an under bracket to represent the space. For example, `Hi There` should be written as `Hi_There_`.

```
1 import java.util.Scanner;
2
3 public class Exam01Trace02 {
4
5     public static void main(String[] args) {
6         Scanner keyboard = new Scanner(System.in);
7
8         System.out.print("Input a string: ");
9         String str = keyboard.nextLine();
10
11         System.out.println(str.length());
12         System.out.println(str.charAt(10));
13         System.out.println(str.indexOf("a"));
14         System.out.println(str.indexOf("e", 17));
15         System.out.println(str.lastIndexOf("e", 17));
16
17         String str2 = str.substring(5, 12);
18         String str3 = str.substring(25);
19
20         System.out.println(str2);
21         System.out.println(str3);
22         String str4 = str2 + str3;
23         System.out.println(str4);
24         System.out.println(str4.trim());
25         System.out.println(str4.toUpperCase());
26     }
27 }
```

Input a string: `Well,_I_have_never_been_so_insulted!`

3 Coding (15 Points Each)

1. Write a program that will take in an entire sentence that has the word “and” in it. The program should then split the sentence at the word “and” and print out the two half sentences. A sample run is below, the user typed in This class is very easy and I am going to ace this exam.

```
Input a string with the word 'and' in it:
This class is very easy and I am going to ace this exam.
This class is very easy
and I am going to ace this exam.
```

```
import java.util.Scanner;

public class Exam01_1 {

    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);
```

```
    }
}
```

2. Write a program that will ask the user for three exam scores and a final exam score. The exams are worth 100 points each and the final is worth 200 points. Have the program calculate the student's percentage average and print it to the screen. Also have the program determine if the student earns an A for the class, an average of 90 or higher. If they do then have the program print out Congratulations you earned an A. and if the student did not earn an A have the program print out You needed to work a little harder this semester.
-

```
import java.util.Scanner;

public class Exam01_2 {

    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);
```

```
    }
}
```

3. Write a program that will play the following game. Have the computer simulate the rolling of two six-sided die and the flipping of two coins. If the coins are both heads have the program tell the user that they won and the dollar amount they won is the sum of the two dice. For example, if the player wins the message should look like, Congratulations you win \$6.00. If the two coins are not both heads have the program print out Sorry, you lose.
-

```
import java.util.Scanner;

public class Exam01_3 {

    public static void main(String[] args) {
        Scanner keyboard = new Scanner(System.in);
```

```
    }
}
```