# ICS 111 Spring 2016 Final Exam, May 9, 2016

Clearly write you name on the **front** and **back** of this exam.

This exam is closed-book. No calculators or computers are allowed. There are a total of 100 points. Be sure to answer all parts of each question.

**Question 1** (5 points): Explain the difference between *high-level* languages and *machine* languages

**Question 2** (5 points): What is the difference between a *compiler* and an *interpreter*?

**Question 3** (5 points): What exactly would be the output of: **System.out.println(answer);** in each of the following cases?

**double answer = 2 \* 60 – 50 / 5 + 5;**

**int answer = 30 + 20 / 5 \* 2 – 2;**

**double answer = (30 + (20 / 5)) \* 2 - 2;**

**int answer = ((30 + 20) / 5) % (2 + 1);**

**int answer = 60 – 50 / (5 + 5);**

**Question 4** (5 points): Write the class declaration for class **Student** that implements the interface **GradeLevel** and is a subclass of **Person**. You don’t need to fill in the class body.

**Question 5** (5 points): What is an *algorithm*?

**Question 6** (5 points): When should you use the following loops?

*while*

*do..while*

*for*

**Question 7** (5 points): What exactly is the output of this code?

**int [] x = { 1, 2, 3, 4, 5, 6 };**

**int y = x.length;**

**do {**

**switch (y) {**

**case 1:**

**System.out.print( x[y] );**

**break;**

**case 5:**

**System.out.print( x[y] );**

**break;**

**default:**

**System.out.print( “x” );**

**}**

**} while (y-- > 0);**

**Question 8** (5 points): Write a *for-each* loop that calculates the sum of an Integer array A.

**Question 9** (5 points): Use the following code to answer the following questions.

**int x = 25;**

**int y = 20;**

**try {**

**Scanner s = new Scanner(System.in);**

**int z = s.nextInt();**

**if ((z == x) || (z < y)) {**

**System.out.print(“a”);**

**}**

**else {**

**Sytem.out.println(“b”);**

**}**

**}**

**catch (InputMismatchException e) {**

**System.out.print(“c”);**

**}**

**System.out.print(“d”);**

What will be the output if the user inputs **15**?

What will be the output if the user inputs **20**?

What will be the output if the user inputs **25**?

What will be the output if the user inputs **30**?

What will be the output if the user inputs **20.0**?

Use the following code to answer questions **10** and **11**:

**String [][] str = { { “H”, “J”, “K”, “L”, “S” }, { “A”, “E”, “I”, “O”, “U” } };**

**for (int x = 0; x < 2; x++) {**

**for (int y = 0; y < 2; y++) {**

**System.out.print( str[x][y] );**

**}**

**}**

**System.out.println();**

**Question 10** (5 points): What exactly is the output of this code?

**Question 11** (5 points): Write a single line of code that concatenates letters from the **str** array to spell the word “LEI” and assign the string to the variable **gift**.

Declare the variable and assign it in the same line.

**Question 12** (10 points): Write a function **minimum** that takes a parameter **data,** and array of **doubles**. The function should return the minimum value in the array.

**Question 13** (5 points): What exactly would be the output of: **System.out.println(answer);** in each of the following cases?

**double answer = 30 / 5 + 5 % 2;**

**double answer = (30 / 5 + 5) % 2;**

**int answer = 30 + 5 / 5 \* 2;**

**int answer = 30 / 5 + 5 \* 2;**

**int answer = 30 / (5 + 5) \* 2;**

**Question 14** (5 points): Describe the binarySearch algorithm for an array of doubles.

**Question 15** (10 points): Write a function **linearSearch** that takes two parameters, an array of ints **data** and an int **value**. The function should return the index of **value** if it is in the array or **-1** if **value** is not in the array.

**Question 16** (5 points): Name three sorting algorithms we learned this semester.

**Question 17** (5 points): Java has a standard class called **JFrame**. What are two parts to a **JFrame**?

**Question 18** (5 points): Java has a standard class called **JPanel**. Discuss two ways a **JPanels** can be used.

**Extra Credit:** What is the most interesting thing you learned in this class? (Any answer relevant to the class material will receive credit.)