

This work complies with the JMU Honor Code. I have neither given nor received unauthorized assistance, and I will not discuss the exam contents with anyone who has not taken it for credit.

Name: _____

Signature: _____

1. (12 points) For each scenario, circle which type of error will occur.

- | | | | |
|---|-----------------------|----------------------|----------------|
| i. Omitting the declaration of a variable | <i>compiler error</i> | <i>runtime error</i> | <i>neither</i> |
| ii. Failing to initialize a class attribute | <i>compiler error</i> | <i>runtime error</i> | <i>neither</i> |
| iii. Dividing by zero in the source code | <i>compiler error</i> | <i>runtime error</i> | <i>neither</i> |
| iv. Assigning an int to a double variable | <i>compiler error</i> | <i>runtime error</i> | <i>neither</i> |
| v. Using a negative index for an array | <i>compiler error</i> | <i>runtime error</i> | <i>neither</i> |
| vi. Failing to initialize a local variable | <i>compiler error</i> | <i>runtime error</i> | <i>neither</i> |

2. (12 points) Vocabulary Matching

- | | |
|-------------------------|---|
| _____ alias | A) A collection of values of the same type identified by indexes |
| _____ array | B) A variable that represents an attribute of a specific object |
| _____ final variable | C) A variable that references the same object as another variable |
| _____ instance variable | D) Replacing a default implementation of a method, such as equals or toString |
| _____ overload | E) A variable defined at the class level and shared by all instances of the class |
| _____ override | F) Defining more than one method with the same name but different parameters |
| _____ static variable | G) To iterate a set of values and perform a similar operation on each one |
| _____ traverse | H) A variable that, once initialized, cannot be assigned a new value |

3. (12 points) One-Liners

- i. Write an **expression** that instantiates a `StringBuilder` and calls the default constructor.
- ii. Write a **statement** that declares and initializes the constant integer `SIZE` to the value 100.
- iii. Write a **statement** that declares an array of integers named `data`.
- iv. Write an **expression** that instantiates an array of 5 double values.
- v. Write a **statement** that declares and initializes the integer array `easy` to the values 1, 2, 3.
- vi. Write a **statement** that instantiates and assigns the array 4, 5, 6 to the existing variable `data`.

4. (12 points) List the following language elements from smallest to largest, in terms of how programs are structured: *class*, *expression*, *method*, *package*, *statement*, *token*. Give an example for each one.

(smallest) _____ Example: _____

_____ Example: _____

_____ Example: _____

_____ Example: _____

_____ Example: _____

(largest) _____ Example: _____

5. (12 points) What does each code segment output to the screen? *You must answer this question entirely on your own; do not use a computer to check your work.*

```
public static String hello(String sep) {
    return "Hello" + sep + "World";
}
public static void main(String[] args) {
    hello(", ");
}
```

```
public static int pow3(int y) {
    y = y * y * y;
    return y;
}
public static void main(String[] args) {
    int y = 5;
    pow3(y);
    System.out.println(y);
}
```

```
System.out.println("1/4 = " + 1/4);
```

```
int[] stats = null;
System.out.println(stats.length);
```

```
int[] stats = {};
System.out.println("stats[0] = " + stats[0]);
```

```
int x = 2;
int y = 3;
x = y;
y = x;
System.out.println("x=" + x + "\ty=" + y);
```

6. (12 points) Complete the following program. It's supposed to output the sum of two command-line arguments x and y .

```
public class Add {
    public static void main(String[] args) {
        if (_____ ) {
            System.err.println("Error: must have exactly 2 arguments");
            return;
        }

        double x = _____

        double y = _____

        System.out.println("Sum = " + _____
    }
}
```

What is the command to run this program with the arguments 1.23 and 4.56?

What is the command to create a zip archive named `Add.zip` that contains the files `Add.java` and `AddTest.java`?

7. (20 points) Read through the attached source code for `Alien`, `Location`, and `MIB`. Using the placeholders on the next page, draw a memory diagram for the entire program. Do not erase any objects that are no longer referenced at the end of `main`. Show `null` values as empty boxes.

(draw your answer on the next page)

8. (8 points) What does the `MIB` program output? Be careful; the print statements are not at the end of the program. So they won't necessarily match your final memory diagram.

Alien

Location

a1

a2

a3

a4