Java review

Classes

Here is the format for a class, in general (left column) and in a specific example (right column).

```java
public class className {
    attributes
    constructors
    other methods
}

public class SillyClass {
    private int value;
    public SillyClass(int value) {
        this.value = value;
    }
    public int getValue() {
        return value;
    }
    public void setValue(int newValue) {
        value = newValue;
    }
}
```

The code for a class goes into the file named after the class; the example code SillyClass should go into SillyClass.java.

Your program will need a special method called main, which is where it will start executing. The template for such a method is

```java
public static void main(String[] args) {
}
```

Variables

Here are the main variable types and their main operations:

1. int: +, −, *, / (integer division; rounds down), % (mod operator; gives remainder)
2. double: +, −, *, /
3. boolean: &&, ||, !
   To get a boolean from a numeric type, use ==, !=, <, >, <=, or >=.
4. String: .length(), .equals(), .substring()

Variables must be declared as attributes, local variables, or method parameters before they can be used. To create objects, you need to both declare and create the object using new as in the following:

```java
SillyClass theObj;  //declares theObj to be an object of type SillyClass
theObj = new SillyClass(42);  //creates object for theObj to refer to
   //calls its constructor
```
Arrays

A special kind of object is an array, which stores a group of variables with the same type in different numbered cells. The type of an array is the type of thing it stores followed by [], as in `int[]`. These must be declared and then created with `new` giving the size of the array:

```java
int[] nums; // declares nums to be an array of ints
nums = new int[100]; // creates an array containing 100 ints
```

Arrays of objects require a call to `new` to create the array and then a call to `new` for each object stored in it:

```java
SillyClass[] bunchOfSillies;
bunchOfSillies = new SillyClass[3]; // creates array, but not objects in it
bunchOfSillies[0] = new SillyClass(19);
bunchOfSillies[1] = new SillyClass(-8);
bunchOfSillies[2] = new SillyClass(65);
```

Conditionals (If statements)

```java
if(booleanExpression) {
    thenClause
}
```

Or...

```java
if(booleanExpression) {
    thenClause
} else {
    elseClause
}
```

Loops

While loops:

```java
while(test) {
    body
}
```

```java
while(n != 1) {
    if(n % 2 == 0) {
        n = n/2;
    } else {
        n = 3*n + 1;
    }
}
```

For loops:

```java
for(initialization; test; increment) {
    body
}
```

```java
for(int i=0; i<10; i++) {
    System.out.println(i+1);
}