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Java Cheat Sheet

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1 Java: General Things to Remember

1. All code must be inside of a class definition (except import and package statements).
2. The name of the class in a file must match the name of the file. For example, "public class LinkedList" must be in a file called "LinkedList.java"
3. Classes can contain a method "public static void main(String[] args)" as an entry point to the whole program.
4. Whitespace does NOT matter in java. The compiler will completely ignore all whitespace.

2 Primitive Data Types

The primitive variable types are:

```
int x = 5; //integers
double d = 3.4; //decimal values
char c = 'h'; //characters. Use single quotes.
boolean b = false; //true or false
```

```
5
  /* Other much less commonly used */
7 byte b = 24b;
  short s = -8s;
9 long l = 2000000;
  float = 4.567;
```

Some examples of using these data types include:

```
  int x;       //automatically set to 0 by default
2 x++;         //increment integer by 1
  x--;         //decrement integer by 1
4
  int z = 14;
6
  int total = (x + z) * x;     //expressions
8 int remainder = x % z;       //remainder after x / z

10 /* Boolean operators */
   boolean b1 = false;
12 boolean b2 = true;
   boolean result;
14
   result = b1 && b2;  //logical AND
16 result = b1 || b2;  //logical OR
   result = !b1;       //logical negation
```

3 Input Output

Input from the keyboard can be done like this:

```
1 Scanner in = new Scanner(System.in);     //make a scanner object
  int x = in.nextInt();                    //read int from keyboard
3 double y = in.nextDouble();              //read double from keyboard
  float f = in.nextFloat();                //read float from keyboard
5 boolean b = in.nextBoolean();            //read bool from keyboard
  long l = in.nextLong();                  //read long from keyboard
7 String s = in.next();                    //read string from keyboard
```

Input from a file can be done like this:

```
1 BufferedReader in =
```

```
                    new BufferedReader(new FileReader("inputfile.txt"));
String text = in.readLine();     //reads the next line
in.close();
```

Output to the console is done like this:

```
//prints text concatenated with x
System.out.print("The answer is " + x);

//prints and moves cursor to next line
System.out.println("something else");
```

Output to a file can be done like this:

```
PrintWriter outFile =
                    new PrintWriter(new FileWriter("outputfile.txt")));
outFile.print("Hello ");
outFile.println("world");
outFile.close();
```

4 Strings

Strings are reference types in Java (so they are NOT primitives).

```
String s1 = "Hello";             //example string
String s2;                       //"" empty string by default
String s3 = new String("Hi");    //Also makes a string
```

Common operators on strings include:

```
String result;

result = s1 + s2;    //"hi " + "there" = "hi there"
s1.length();         //returns length of string
s1.charAt(2);        //accesses the char at position 2 (indexed from 0)
s1.substring(1,3);   //part of string starting at index 1, length 3
s1.equals(s2);       //compare strings using this structure
s1.toUpperCase();    //returns the string as all uppercase
s1.toLowerCase();    //returns the string as all lowercase
```

Oftentimes, we need to convert from a string version of a number into its actual type. We can do this:

```
Integer.parseInt("123");     //converts string "123" into integer 123
Double.parseDouble("3.14")   //converts string "3.14" into double 3.14
```

5 Arrays

Three primary ways to instantiate arrays:

```
double[] dArray = new double[5];     //know the size, but not contents
int[] oddNumbers = {1,3,5,7,9};      //know the contents already

int x;
/* Stuff here */
String[] sArray = new String[x];     //use variable to intialize array

int[][] = new int[5][4];             //two-dimensional array
```

Some common things we do with arrays include:

```
x[3] = 5;   //Access array at position 3, set to 5.
x.length;   //get the number of elements in array

/* How to loop through an array */
for(int i=0; i<x.length; i++){
    System.out.println(x[i]);
}
```

6 Java Math Library

Java contains several functions inside the Math class that are useful. Among them:

```
Math.abs(x);              //absolute value of x
Math.max(a,b);            //larger of a and b
Math.min(a,b);            //smaller of a and b
Math.sin(theta);          //sin trig function
Math.cos(theta);          //cos trig function
Math.tan(theta);          //tangent trig function
Math.toRadians(deg);      //convert deg to radians
Math.toDegrees(rad);      //convert rad to degrees
Math.exp(x);              //raises e^x
Math.log(x);              //natural logarithm
```

```
Math.pow(a,b);          //raise a to power of b
Math.sqrt(a);           //square root of a
Math.E;                 //value of constant e
Math.PI;                //pi
```