Console I/O

- Console I/O is input from the standard input device and or output to the standard output device.
- The keyboard is the standard input device.
- The screen/monitor is the standard output device.
- Java gives us the Scanner class to to read from the keyboard (and text files).
- Java gives us System.out.print(), System.out.println() and System.out.format() to write text to the standard output device.

Console output using System.out.print() and println()

```
System.out.println("Hello World"); // prints Hello World and a newline
System.out.print("Hello World");   // prints Hello World without a newline
int x=10, int y=5;
System.out.println( "x+y=" + x + y ); // prints  x+y=105  DO YOU SEE WHY?
                  ( "x+y=10"   + y ); // "x+y=" + 10   evals to "x+y=10"
                  ( "x+y=105" );      // "x+y=10" + 5  evals to "x+y=105"
```

The expression in the ()s must evaluate to a single value. That value will be printed as a string to the output. If there are numbers and Strings mixed around the + operator, the + operator will convert the number to a String and concatenate. The operators are evaluated * and / first (left to right) then + and – (left to right).

```
System.out.println( "x+y=" + (x + y) ); // prints  x+y=15
```

The ()s around the second x+y force it to evaluate before the first +. Nested ()s evaluate inside out.

System.out.format()

- When printing numbers to the screen you can control the format width and number of decimal places of precision using the format method.

- double pi = 3.14159265358979323846264338; // to 26 places
  // BUT only up to 15 places max can be stored

  System.out.println("pi=" + pi);
  // **prints 3.14159265358979323846264338**

  // use format() to force max width of 6 places counting dot
  / with 4 coming after the dot. The 59 rounds to 6
  System.out.format("pi=%6.4f", pi); // **prints 3.1416**

Input from keyboard using Scanner

```
// System.in  is offical name of the keyboad device
Scanner kbd = new Scanner( System.in );
System.out.print("Enter your name: "); // notice I don't write a newline
String name = kbd.next(); // stop. wait until user types stuff and hits return
System.out.println("You entered " + name );
// BEWARE! DO NOT ENTER MORE THAN ONE TOKEN (i.e. no spaces)

System.out.print("Enter single integer: ");
int number = kbd.nextInt(); // Attempt to convert to int then assign into number
System.out.println("Number you entered was " + number );

System.out.print("Enter a double: ");
double real = kbd.nextDouble(); // Attempt to convert to double then assign into real
System.out.println("Number you entered was " + real );

System.out.print("Enter a boolean: ");
boolean bool = kbd.nextBoolean(); // must enter literal true or literal false
System.out.println("bool you entered was " + bool );
```