

Text processing: printf formatting & aligning output

Building Java Programs
Chapter 4.3

Subset of the Supplement Lesson slides from: Building Java Programs, Chapter 4.3
by Stuart Reges and Marty Stepp (<http://www.buildingjavaprograms.com/>)

Formatting text with `printf`

```
System.out.printf("format string", parameters);
```

- A format string can contain *placeholders* to insert parameters:

- `%d` integer
- `%f` real number
- `%s` string

- these placeholders are used instead of `+` concatenation

– Example:

```
int x = 3;
int y = -17;
System.out.printf("x is %d and y is %d!\n", x, y);
// x is 3 and y is -17!
```

- `printf` does not drop to the next line unless you write `\n`

printf width

- `%Wd` integer, **W** characters wide, right-aligned
- `%-Wd` integer, **W** characters wide, *left*-aligned
- `%Wf` real number, **W** characters wide, right-aligned
- ...

```
for (int i = 1; i <= 3; i++) {  
    for (int j = 1; j <= 10; j++) {  
        System.out.printf("%4d", (i * j));  
    }  
    System.out.println();    // to end the line  
}
```

Output:

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30

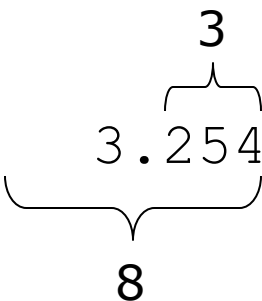
printf precision

- `%.Df` real number, rounded to D digits after decimal
- `%W.Df` real number, **W** chars wide, **D** digits after decimal
- `%-W.Df` real number, **W** wide (left-align), **D** after decimal

```
double gpa = 3.253764;  
System.out.printf("your GPA is %.1f\n", gpa);  
System.out.printf("more precisely: %8.3f\n", gpa);
```

Output:

```
your GPA is 3.3  
more precisely: 3.254
```



And on other example if you are curious...

printf question

- Modify our `Receipt` program to better format its output.
 - Display results in the format below, with \$ and 2 digits after .
- Example log of execution:

```
How many people ate? 4
```

```
Person #1: How much did your dinner cost? 20.00
```

```
Person #2: How much did your dinner cost? 15
```

```
Person #3: How much did your dinner cost? 25.0
```

```
Person #4: How much did your dinner cost? 10.00
```

```
Subtotal:    $70.00
```

```
Tax:         $5.60
```

```
Tip:         $10.50
```

```
Total:      $86.10
```

printf answer (partial)

...

```
// Calculates total owed, assuming 8% tax and 15% tip
```

```
public static void results(double subtotal) {  
    double tax = subtotal * .08;  
    double tip = subtotal * .15;  
    double total = subtotal + tax + tip;  
  
    // System.out.println("Subtotal: $" + subtotal);  
    // System.out.println("Tax: $" + tax);  
    // System.out.println("Tip: $" + tip);  
    // System.out.println("Total: $" + total);  
  
    System.out.printf("Subtotal: $%.2f\n", subtotal);  
    System.out.printf("Tax: $%.2f\n", tax);  
    System.out.printf("Tip: $%.2f\n", tip);  
    System.out.printf("Total: $%.2f\n", total);  
}  
}
```