

Object-Oriented Programming I

Random class (& calculating an average)

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The Random Class

- Useful for generating random numbers for games or simulations
- Is found in the Java Library, `java.util` package
 - Must create an object (object variable)
- `nextDouble()` returns a uniformly distributed random number from 0.0 to 1.0
- `nextBoolean()` returns a random boolean true/false
- `nextInt(n)` returns a uniformly distributed integer from 0 to n-1
 - Can return zero but **not** 'n', result range is 0 to (n-1)

Random Class Exercise 1

- A) Give the code needed to generate a random integer from 1 to 100
- B) Give the code needed to generate a random floating point number from 15.0 to 20.0
- C) Give the code needed to generate a random floating point number from -1.0 to +1.0

The Random Class: Seed

- ❑ The numbers returned by the Random class are *pseudo-random*
- ❑ This means they are not truly unpredictable
 - They come from a mathematical formula
- ❑ By setting the random number **seed** you can regenerate the same sequence of numbers
 - Very useful for software testing
- ❑ `setSeed(n)` method of the Random class sets the seed where 'n' is a 'long'
 - Reuse the same seed to get the same sequence!

How to calculate an average

- If your program knows all the numbers at the same time (and how many), do it like this

```
aveMark = (mark1 + mark2 + mark3) / 3.0;
```

- If your program works with the numbers to average one at a time use variables to add up the total (**sum**) and **count** how many numbers there are

- For each number

```
sum = sum + number;  
count = count + 1;
```

- In some cases using local variables won't work (why?)

Random Class Exercise 2

- Extend your answer for Exercise 1 (A)
 - Write a Java program which calculates and prints a random number from 1 to 100 five times
 - Use a method to calculate and print the random number
 - Call the method five times from your main method
 - Also print out the average of all the random numbers just before the program ends
 - Hint: Keep track of the sum and count as in the previous slide
 - Now calculate 10 random numbers, does it still work?