# Exercises 6
# Chapter 6 Methods

COMP217
Java Programming
Spring 2019

Instructor: Gil-Jin Jang

# Ex6-1 Pass by Value

- Write a java code file, TestPassByValue.java
  - The codes are already given
- Translate them into TestPassByValue.c
  - Submission: TestPassByValue.java and TestPassByValue.c

```java
public class TestPassByValue {
  public static void main(String[] args) {
    int num1 = 1;
    int num2 = 2;
    System.out.println("Before invoking swap, " +
      num1 is " + num1 + " and num2 is " + num2);     // 1 and 2
    swap(num1, num2);
    System.out.println("After invoking swap method, " +
      num1 is " + num1 + " and num2 is " + num2);     // 1 and 2
  }

  /** Swap two variables */
  public static void swap(int n1, int n2) {
    System.out.println("\tBefore swapping, n1 is " + n1
      + " and n2 is " + n2);     // 1 and 2
    // Swap n1 with n2
    int temp = n1;
    n1 = n2;
    n2 = temp;
    System.out.println("\tAfter swapping, n1 is " + n1
      + " and n2 is " + n2);     // 2 and 1
  }
}
```

# Ex6-2 Method Overloading

- Write a java code file, TestMethodOverloading.java
  - The codes are already given

- Translate them into TestMethodOverloading.c
  - Submission: TestMethodOverloading.java and TestMethodOverloading.c

# Method Overloading

```java
public class TestMethodOverloading {
  public static void main(String[] args) {
    System.out.println("max(3, 4) = " + max(3, 4));   // (1)
    System.out.println("max(3.0, 5.4) = " + max(3.0, 5.4)); // (2)
    System.out.println("max(3.0, 5.4, 10.14) = "
    + max(3.0, 5.4, 10.14));      // (3)
  }

  public static int max(int num1, int num2) {   // (1)
    if (num1 > num2) return num1;
    else return num2;
  }

  public static double max(double num1, double num2) {   // (2)
    if (num1 > num2) return num1;
    else return num2;
  }

  public static double max(
      double num1, double num2, double num3) {   // (3)
    return max(max(num1, num2), num3);
  }
}
```

# Ex6-3 Random Character Generation

- Write two java files, RandomCharacter.java and TestRandomCharacter.java
  - The codes are already given

- Translate them into a single RandomCharacter.c
  - Note: Use random seed for C code as well
  - Submission: RandomCharacter.java, TestRandomCharacter.java, RandomCharacter.c

# Class RandomCharacter

```java
// RandomCharacter.java: Generate random characters
public class RandomCharacter {
  /** Generate a random character between ch1 and ch2 */
  public static char getRandomCharacter(char ch1, char ch2) {
    return (char)(ch1 + Math.random() * (ch2 - ch1 + 1));
  }


  /** Generate a random lowercase letter */
  public static char getRandomLowerCaseLetter() {
    return getRandomCharacter('a', 'z');
  }


  /** Generate a random uppercase letter */
  public static char getRandomUpperCaseLetter() {
    return getRandomCharacter('A', 'Z');
  }
```

```java
  /** Generate a random digit character */
  public static char
    getRandomDigitCharacter() {
    return getRandomCharacter('0', '9');
  }


  /** Generate a random character */
  public static char
    getRandomCharacter() {
    return getRandomCharacter(
        '\u0000', '\uFFFF');
  }
}
```

# Class TestRandomCharacter

```
// TestRandomCharacter.java: testing RandomCharacter class
public class TestRandomCharacter {
 /** Main method */
 public static void main(String args[]) {
   final int NUMBER_OF_CHARS = 175;
   final int CHARS_PER_LINE = 25;

   // Print random characters between 'a' and 'z', 25 chars per line
   for (int i = 0; i < NUMBER_OF_CHARS; i++) {
    char ch = RandomCharacter.getRandomLowerCaseLetter();
    if ((i + 1) % CHARS_PER_LINE == 0)  System.out.println(ch);
    else  System.out.print(ch);
   }
  }
}
```

```
$ java TestRandomCharacter
fkdwexidvsonrqaxqbafyxzgr
bdhtvbtclxsvknbiyseyhbrzp
wiqwatordvjpwfuksvamzqmed
bbvapxyajyqmpcecvxaqeqjyk
oqraxcxwicilqbbupmdkqqcez
aomtugqogriamiwashvpamubz
qfentaeecewdmbdpdtkdbjrcj
```

# Ex 6-4 Random Number Generation

- Write **Java** and **C** programs that receives the number of characters (length), and generates variable name of the given length randomly
  - From {'a' … 'z', 'A', … 'Z', '0', … '9', '_', '$'}, no digit for the first character
  - Note: Use random seed for C code as well
  - Submission: VariableNameRandomGen.java and VariableNameRandomGen.c

```
$ javac VariableNameRandomGen.java
$ java VariableNameRandomGen
Length of the variable? 20
dUt3CJV2aIhBQ3XfSkPd
$ java VariableNameRandomGen
Length of the variable? 30
MtfSqYNJTBPPPgkrMni1ex27p39Bls
$ java VariableNameRandomGen
Length of the variable? 40
utjjJX$$uJfI0n1_j86CFC5nEEi_mKacJlQt02cK
```