Assignment 4
Hand-in date: Monday 28-09-2015 15:00h

4.1 True or false?
(a) A method has exactly one return statement.
(b) A method has at least one return statement.
(c) A method has at most one return value.
(d) A method with return value void never has a return statement.
(e) When executing a return statement, the method exits immediately.
(f) A method with return value void must print a result.
(g) A method without parameter variables always returns the same value.

4.2 Consider the following method that computes compound interest for an account with an initial balance of **$10000** and an interest rate of **5** percent:

```
public static double balance(int years) {
   return 10000 * Math.pow(1.05, years);
}
```

The balance and interest rate may vary for different accounts. Rewrite the method to cope with this.

4.3 Rewrite the program from exercise 3.11 to make use of a method with the following signature:

```
public static boolean isLeapYear(int year)
```

4.4 Write a method

```
public static double readDouble(String prompt)
```

that displays the prompt string, followed by a space, reads a floating-point number in, and returns it. Here is a typical usage:

```
salary = readDouble("Please enter your salary");
percentageRaise = readDouble("What percentage raise would you like?");
```

4.5 Write the methods with the following signatures

```
//Return the reversal of an integer, i.e., reverse(456) returns 654
public static int reverse(int number)

//Return true if number is a palindrome
public static boolean isPalindrome(int number)
```

Assignment 4
Hand-in date: Monday 28-09-2015 15:00h

Use the reverse method to implement **isPalindrome**. A number is a palindrome if its reversal is the same as itself. Write a test program that prompts the user to enter an integer and reports whether the integer is a palindrome.

4.6 Write a method that displays an n-by-n matrix using the following signature:

public static void printMatrix(**int** n)

Each element is **0** or **1**, which is generated randomly. Write a test program that prompts the user to enter **n** and displays an n-by-n matrix. Here is a sample run:

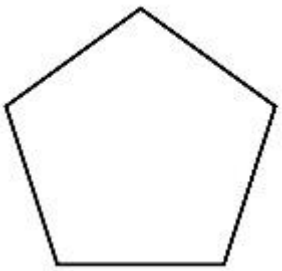
```
Enter n: 3
0 1 0
0 0 0
1 1 1
```

4.7 Write a method that finds the number of occurrences of a specified character in a string using the following signature:

public static int count(**String** str, **char** a)

For example, **count("Welcome", 'e')** returns **2**. Write a test program that prompts the user to enter a string followed by a character and displays the number of occurrences of the character in the string.

4.8 The area of a pentagon can be computed using the following formula:



$$Area = \frac{5 * s^2}{4 * \tan(\frac{\pi}{5})}$$

Write a method that returns the area of a pentagon using the following signature:

public static double area(**double** side)

Write a main method that prompts the user to enter the side of a pentagon and display its area. Here is a sample run:

Assignment 4
Hand-in date: Monday 28-09-2015 15:00h

```
Enter the side: 5.5
The area of the pentagon is 52.04444136781625
```

Non-mandatory: Given the calculated area you can find the radius of the pentagon via the following formula:

$$r = \sqrt{\frac{Area}{5 * \tan(\frac{\pi}{5})}}$$

Write a method that returns the radius of a pentagon using the following signature:

```
public static double radius(double area)
```

4.9 Write a method

```
public static String middle(String str)
```

That returns a string containing the middle character in str if the length of str is odd, or the two middle characters if the length is even. For example, middle("middle") returns "dd".

4.10 The international standard letter/number mapping for telephones is shown in the picture below.

Write a method that returns a number, given an uppercase letter, as follows:

```
public static int getNumber(char uppercaseLetter)
```

Write a test program that prompts the user to enter a phone number as a string. The input may contain letters. The program translates a letter (uppercase or lowercase) to a digit and leaves all other characters intact. Here is a sample run of the program:

```
Enter a string: 1-800-Flowers
1-800-3569377
```

Assignment 4
Hand-in date: Monday 28-09-2015 15:00h

```
Enter a string: 1800flowers
18003569377
```