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**Introduction to Computer Programming, Spring Term 2018**  
**Practice Assignment 3**

Discussion: 3.3.2018 - 8.3.2018

**Exercise 3-1**     ATM  
**To be discussed in the tutorials**

Write a program that asks a user to enter his/her pincode to the ATM machine. The pincode is generated randomly once and user is notified with this pincode. The ATM machine then asks the user to enter the pincode and the user has maximum 3 trials to enter. After that, a corresponding message should be shown to the user.

The output should be something like:

```
Please enter your pincode
5643
```

```
Please enter your pincode
5645
```

```
Please enter your pincode
5465
```

```
You exceeded your trials. We will lock your account!
```

**Exercise 3-2**     Adder  
**To be discussed in the tutorials**

Write a program that adds up integers that the user enters. First the program asks how many numbers will be added up. Then the program prompts the user for each number. Finally, it prints the sum.

The output should be something like:

```
How many integers will be added:
5
Enter integer 1:
3
Enter integer 2:
4
Enter integer 3:
-4
Enter integer 4:
-3
Enter integer 5:
7
```

```
The sum is 7
```

**Exercise 3-3** Euclidean Algorithm  
**To be discussed in the tutorials**

The Euclidean algorithm determines the greatest common divisor (GCD) of two positive numbers by repeatedly replacing the larger number with the result of subtracting the smaller one from it until the two numbers are equal.

Write a Java program for Euclidean algorithm where the user has to enter the two numbers and the program should calculate their greatest common divisor. The output should be something like:

```
Please, enter a first number:
45
Please, enter a second number:
22
The GCD of 45 and 22 is 1
```

**Exercise 3-4** Caesar Cipher  
**To be discussed in the tutorials**

Write a Java program which takes two input variables `message` of data type `String` and `key` of data type `int`. The program should shift each character in `message` with a distance of `key`. For example: if `key=3` then `a` will be replaced by `d` and `b` will be replaced by `e` and so on.

**Hint:** You can use the following method

- `charAt(int index)`: Returns the character at the specified index. The first character of the sequence is at index 0, the next at index 1 and so on.

```
String s = "Hello";
char c = s.charAt(0);
```

The value of `c` is `'H'`.

The output should be something like this:

```
Please enter the Message:
Hat
Please Enter the Key:
3
The encrypted word is:
Kdw
```

**Exercise 3-5** String Manipulation  
**To be discussed in the labs**

Write a program that determines the number of consonants, vowels, punctuation characters, and spaces in an input line. Read in the line into a `String` (in the usual way). Now use the `charAt()` method in a loop to access the characters one by one. Use a switch statement to increment the appropriate variables based on the current character. After processing the line, print out the results.

**Exercise 3-6** Fixed Length

Write a program that asks the user to enter two words. The program then prints out both words on one line. The words will be separated by enough dots so that the total line length is 30. We can use it to make an index for a book. The user enters the name of the chapters/sections and the page number and the program generate the index. You can only print one dot at a time.

```
Enter first word:
Chapter 5
Enter second word:
153
```

```
Chapter 5.....153
```

**Exercise 3-7** Stream of Numbers

Write a Java program to read a list of nonnegative integers and outputs the maximum integer, the minimum integer, and the average of all the integers. The end of the input is indicated by the user entering a negative number. Note that the negative number is not used in finding the maximum, minimum, or average. The output should be something like this:

```
Please enter a sequence of positive numbers
2
3
5
4
-1
The maximum number is : 5
The minimum number is: 2
The average is: 3.5
```

Use in one program a `while` loop and in another program a `do while` loop.

**Exercise 3-8** Triangle N  
**To be discussed in the labs**

Write a Java program to construct a triangle shape of numbers given that `n` is an input from the user. For example if `n=6`, the shape should look like the following:

```
1
12
123
1234
12345
123456
```

***Solve using a single loop only.***