



Beni-Suef University
Faculty of Computers and Artificial Intelligence

First Term 2021/2022

CS 241 - Object Oriented Programming

SHEET #2

Due date: 22-11-2021



1. Write a program that receives a character and displays its ASCII code (an integer between 0 and 127).
2. Write a program that prompts the user to enter a string and displays its length and its last character.
3. Write a program that prompts the user to enter binary digits and displays its corresponding decimal value.
4. Write a program that prompts the user to enter two strings, and reports whether the second string is a substring of the first string.
5. Write a program that prompts the user to enter a Social Security number in the format DDD-DD-DDDD, where D is a digit. Your program should check whether the input is valid. Here are sample runs:

```
Enter a SSN: 232-23-5435   
232-23-5435 is a valid social security number
```

```
Enter a SSN: 23-23-5435   
23-23-5435 is an invalid social security number
```

6. Write a program that prompts a student to enter a Java score. If the score is greater or equal to 60, display “you pass the exam”; otherwise, display “you don’t pass the exam”. Your program ends with input -1.
7. Suppose that the tuition for a university is 10,000 EGP this year and increases 6% every year. In one year, the tuition will be 10,600 EGP. Write a program that computes the tuition in ten years and the total cost of four years’ worth of tuition after the tenth year.

8. Write a program that displays the following table (note that fahrenheit = celsius * 9/5 + 32):

Celsius	Fahrenheit
0	32.0
2	35.6
.	
.	
.	
98	208.4
100	212.0

9. Write a program that prompts the user to enter the number of students and each student's name and score, and finally displays the names of the students with the highest and lowest scores. Use the next() method in the Scanner class to read a name.
10. Write a program that displays all the numbers from 100 to 1,000, ten per line, that are divisible by 3 and 4. Numbers are separated by exactly one space.
11. Use a while loop to find the smallest integer n such that n^3 is greater than 12,000.
12. Write a program that reads integers, finds the largest of them, and counts its occurrences. Assume the input ends with number 0. Suppose you entered 3 5 2 5 5 5 0; the program finds that the largest is 5 and the occurrence count for 5 is 4.
13. Write a program that reads an integer and displays all its smallest factors in an increasing order. For example, if the input integer is 150, the output should be as follows: 2, 3, 5, 5.
14. Use nested loops that display the following patterns in four separate programs:

Pattern A

```
*
* *
* * *
* * * *
* * * * *
* * * * * *
```

Pattern B

```
* * * * *
* * * *
* * * *
* * *
* *
*
```

Pattern C

```
*
* *
* * *
* * * *
* * * * *
* * * * * *
```

Pattern D

```
* * * * *
* * * * *
* * * *
* * *
* *
*
```

15. Write a program to compute the following summation:

$$\frac{1}{3} + \frac{3}{5} + \frac{5}{7} + \frac{7}{9} + \frac{9}{11} + \frac{11}{13} + \cdots + \frac{95}{97} + \frac{97}{99}$$

16. Write a program that prompts the user to enter a decimal integer then displays its corresponding binary value. Don't use Java's Integer .toBinaryString(int) in this program.
17. Write a program that prompts the user to enter a string and displays the string in reverse order. For example if the user entered ABCD, the program will display DCBA.
18. Write a program that prompts the user to enter two strings and displays the largest common prefix of the two strings. Here are some sample runs:

```
Enter the first string: Welcome to C++ ↵ Enter
Enter the second string: Welcome to programming ↵ Enter
The common prefix is Welcome to
```

```
Enter the first string: Atlanta ↵ Enter
Enter the second string: Macon ↵ Enter
Atlanta and Macon have no common prefix
```

19. Assume that the letters A, E, I, O, and U are vowels. Write a program that prompts the user to enter a string, and displays the number of vowels and consonants (not vowels) in the string. For example:
If the user entered "Programming is fun", then the number of vowels is 5 and the number of consonants is 11.
20. Write a program that lets the user enter the loan amount and loan period in number of years and displays the monthly and total payments for each interest rate starting from 5% to 10%, with an increment of 1/4. Here is a sample run:

```
Loan Amount: 10000 ↵ Enter
Number of Years: 5 ↵ Enter

Interest Rate    Monthly Payment    Total Payment
5.000%           188.71            11322.74
5.250%           189.86            11391.59
5.500%           191.01            11460.70
...
9.750%           211.24            12674.55
10.000%          212.47            12748.23
```

You can use the following formulas to compute the monthly and total payment:

$$\text{monthlyPayment} = \frac{\text{loanAmount} \times \text{monthlyInterestRate}}{1 - \frac{1}{(1 + \text{monthlyInterestRate})^{\text{numberOfYears} \times 12}}}$$

$$\text{totalPayment} = \text{monthlyPayment} \times \text{numberOfYears} \times 12$$

Where the monthly interest rate is the interest rate divided by 1200.

Best Wishes
DR. Noha Yehia