



CYPRUS INTERNATIONAL UNIVERSITY
FACULTY OF ENGINEERING
CMPE112, CPE 112, CTPR112, ITEC112, MISY112, IT112, COMP112
Lab Exercises

Chapter 3: C/C++ control structures.
Chapter 4: loops, iteration and nested loops

Please solve the following questions via C/C++ programming.
You can use any IDE you like.

The Dev C++ is available for PC and can be downloaded at:
<http://www.bloodshed.net/devcpp.html>

The CodeBlocks is a Linux friendly IDE and is available at:
<http://www.codeblocks.org/>

XCode is Mac development environment for free and can be downloaded at:
<https://developer.apple.com/xcode/>

Decision Making and Control Structures

1- Write a complete C++ program that asks to user to enter the temperature of the day in terms of Celsius. According to entered value, show the relevant message given in the following table. Hint: you can solve this question using if/else statement.

30<=Temperature	It's definitely summer
15<=Temperature<30	It might be autumn or spring time
-5<Temperature<=15	It has to be winter

Sample Output:

```
Please enter the temperature of the day: 25  
It can be autumn or spring
```

2- Write a complete C++ program that gets the number of hours that an employee worked per month and the hourly rate he/she gets from his/her work for each month. Based on these inputs, calculate the monthly salary of this person and display a message from the following table according to the calculated salary. Notice that salaries are in terms of \$. Hint: you can solve this question using if/else statement.

TotalMoney>=3500	You earn good dude.
2000<=TotalMoney<=3499	Good job!
1000<=TotalMoney<1999	It's Nice but you can find another job.
0<=TotalMoney<=999	You should really consider finding another job.

Sample Output:

```
Please enter how many hours you have worked: 5
Please enter how much you are getting paid for per hour: 200
1000$
Its nice but i think you can find another job
```

3- Write a complete C++ program that gets the day of the month from the user and display which week this day falls into according to the given table below. Hint: you can solve this question using if/else statement.

0<day<=7	Week 1
8<=day<=14	Week 2
15<=day<=21	Week 3
22<=day<=31	Week 4

Sample Output:

```
Please enter the day of the month: 18
Week 3
```

4- Assume that you are asked to write a program for math students in order to demonstrate how to calculate volume and area of specific 3D geometric shapes. Write a complete C++ program that offers a menu to the user and get relevant data according to the selected shape. Having done so, the program would calculate either the volume or area of the selected shape and display this as the output. Hint: you can solve this question using if/else statement or with switch...case.

1- Calculate the volume of the cube	$V = a^3$
2- Calculate the area of the sphere	$A = 4\pi r^2$
3- Calculate the area of the cylinder	$A = 2\pi r h + 2\pi r^2$

Sample Output 1:

```
1- Calculate the volume of cube
2- Calculate the area of the sphere
3- Calculate the area of the cylinder
Enter the choice (1-3): 1

-----Volume of the cube-----
Please enter the area of the cube: 5
Volume of the cube is: 125
```

Sample Output 2:

```
1- Calculate the volume of cube
2- Calculate the area of the sphere
3- Calculate the area of the cylinder
Enter the choice (1-3): 2

-----Area of the sphere-----
Please enter the radius of the sphere: 5
Area of the sphere is: 314
```

5- Write a complete C++ program that shows the following menu given in the sample run. Once the user selects a specific type of room, the program would prompt the user how many days they want to reserve the selected room. Once this data is taken from the user, the program would calculate the total amount needed to be paid by the user. Notice that the room prices are in terms of dollar. Hint: you can solve this question using if/else statement or with switch...case.

Sample Output:

- 1- Deluxe Suit = 1500\$ per day
- 2- Normal Suit = 750\$ per day
- 3- Deluxe Room = 250\$ per day
- 4- Normal Room = 125\$ per day

```
1- Deluxe Suit -> 1500$/day
2- Normal Suit -> 750$/day
3- Deluxe Room -> 250$/day
4- Normal Room -> 125$/day
Please choose the room you want to reserve: 1
Please enter how may days you want to reserve: 5
Total money is: 7500
```

Loops, Iteration and Nested Loops

6- Write a complete C++ program that displays all natural numbers from 10 to 1 in reverse order. Solve this question using either a for or a while loop.

Sample Output:

```
10,9,8,7,6,5,4,3,2,1
```

7- Write a complete C++ program that displays all even numbers between in between -1 and 20. Solve this question using either a for or a while loop.

Sample Output:

```
0,2,4,6,8,10,12,14,16,18
```

8- Write a complete C++ program that display the total product of all whole numbers in between 1 and 10. Solve this question using either a for or a while loop.

Sample Output:

```
Product is: 362880
```

9- Write a complete C++ program that displays the squares of all integer numbers from 1 to 5. Solve this question using either a for or a while loop.

Sample Output:

```
Square of the 1 is: 1  
Square of the 2 is: 4  
Square of the 3 is: 9  
Square of the 4 is: 16
```

10- Write a complete C++ program that gets a number from the user and calculates its factorial using either a for or a while loop.

Sample Output:

```
Please enter a number to calculate factorial: 5  
Factorial of 5 is: 120
```

11- Write a complete C++ program that gets 10 item prices from the user. The program would calculate the sum of these prices and show this on the screen as the output.

Sample Output:

```
Please enter item 1 price: 25
Please enter item 2 price: 45
Please enter item 3 price: 65
Please enter item 4 price: 85
Please enter item 5 price: 105
Please enter item 6 price: 125
Please enter item 7 price: 145
Please enter item 8 price: 165
Please enter item 9 price: 185
Please enter item 10 price: 205
Total is: 1150
```

12- Write a complete C++ program that gets 5 different numbers from the user. The program would find and display the greatest number from among the numbers user had entered.

Sample Output:

```
Please enter value to number 0: 25
Please enter value to number 1: 22
Please enter value to number 2: 4
Please enter value to number 3: 2
Please enter value to number 4: 45
Greatest number is: 45
```

13- Write a complete C++ program that gets a number greater than 40 from user. Having done so the program would calculate the sum of all even numbers and the sum of all odd numbers starting from 0 up to the entered number. The sum of even and odd numbers would be displayed as the output.

```
Please enter a value greater than 40: 42
Sum of all even numbers: 420
Sum of all odd numbers: 441
```

14- Write a complete C++ program that displays a conversion table for degrees Fahrenheit to degrees Celsius beginning with 20F through 100F in steps of 5F. The conversion formula is given below:

$$\text{Celsius} = 5 \times (\text{Fahrenheit} - 32) / 9$$

SAMPLE OUTPUT

20F	-6C
25F	-5C
30F	1C
.	.
100F	37C

15- Write a complete C++ program that gets the 10 different students ages and calculate the average of these ages. Use a loop (either while or for) to iterate 10 students.

```
Student 1 age is: 18
Student 2 age is: 19
Student 3 age is: 20
Student 4 age is: 21
Student 5 age is: 22
Student 6 age is: 23
Student 7 age is: 24
Student 8 age is: 25
Student 9 age is: 26
Student 10 age is: 28
Average is: 22.6
```

16- Write a complete C++ program that calculates the formula given below. Display the output on the screen.

$$\sum_{n=1}^5 n^3$$

Sample Output:

```
Result is: 225
```

17- Write a complete C++ program that calculates the formula given below and display the output on the screen.

$$\sum_{k=2}^6 (k^2 + k)$$

Sample Output:

```
Sum is: 110
```

18 – Write a complete C++ program that prints the cubes of the numbers from 1 to 10, using a two-column format. Use a loop (either while or for) to iterate the numbers.

Sample Output:

```
1      1
2      8
3     27
4     64
5    125
6    216
7    343
8    512
9    729
10   1000
```

19- Write a complete C++ program that shows the pattern provided below. Use nested loop to solve this question.

```
a
ab
abc
abcd
abcde
abcdef
abcdefg
abcdefgh
abcdefghi
abcdefghij
abcdefghijk
abcdefghijkl
abcdefghijklm
abcdefghijklmn
abcdefghijklmno
abcdefghijklmnop
abcdefghijklmnopq
abcdefghijklmnopqr
abcdefghijklmnopqrs
abcdefghijklmnopqrst
abcdefghijklmnopqrstu
abcdefghijklmnopqrstuv
abcdefghijklmnopqrstuvw
abcdefghijklmnopqrstuvwx
abcdefghijklmnopqrstuvwxy
abcdefghijklmnopqrstuvwxyz
```

20 – Given the following C++ program, trace the source code and find the output when the program runs.

```
#include <iostream>

using namespace std;

int main(){

    int value=0;

    for (int k=1;k<=9;++k)
    {
        for (int z=1;z<=k;++z){

            value=k*z;

            cout << " " << value;

        }

        cout << "\n\n";

    }

}
```