# University Of Vavuniya

## IT 2223 (P): Design and Analysis of Algorithms

## Work Sheet: -01

**Time allowed: Two hours.**

1. A company decided to give a bonus of 5% to an employee if his/her year of service is more than 5 years. Ask the user for their salary and year of service and print the net bonus amount.

2. Take input of age of 3 people by user and determine oldest and youngest among them.

3. Write a C program to read temperature in centigrade and display a suitable message according to the temperature state below:

   Temp < 0 then Freezing weather
   Temp 0-10 then Very Cold weather
   Temp 10-20 then Cold weather
   Temp 20-30 then Normal in Temp
   Temp 30-40 then Its Hot
   Temp >=40 then Its Very Hot

4. Write a program to calculate the electricity bill according to the following criteria.
   (Take the number of units from the user)

| **Unit** | **Price** |
|---|---|
| First 100 units | no charge |
| Next 100 units | Rs 5 per unit |
| After 200 units | Rs 10 per unit |

   (For example, if input unit is 350 then total bill amount is Rs 2000)

5. Write a program to display the last digit of a number.

6. Write a program to check whether a number entered is a three-digit number or not.

7. Write a program to convert temperature from Fahrenheit to Celsius and Celsius to Fahrenheit

   Celsius to Fahrenheit: (°C × 9/5) + 32 = °F
   Fahrenheit to Celsius: (°F − 32) x 5/9 = °C

8. Write a program that calculates the ticket price based on age with the following conditions: age below 12 pay a ticket price of 5, age below 18 pay a ticket price of 10, age below 60 pay a ticket price of 20, age over 60 play a ticket price of 15.

9. An Armstrong number of three digits is an integer such that the sum of the cubes of its digits is equal to the number itself. For example:

   371 is an Armstrong number.
   Since $3^3 + 7^3 + 1^3 = 371$
   407 is an Armstrong number.
   Since $4^3 + 0^3 + 7^3 = 407$

10. Write a c++ program to find all Armstrong numbers in the range 100 to 999

11. Write a program to read the name of a user and the number of electricity units consumed in a particular month and print out the electricity charges according to the given conditions:

    First 50 units Rs. 0.50/unit
    For next 100 units Rs.0.75/unit
    For every unit above 150 Rs.1.50/unit

    For instance, if electricity unit consumed is 163 then the electricity charge will be calculated as follows:

    50*0.5 + 100*0.75 +13*1.5=119.5

    Sample output of the program is given below:

        Enter username: David
        Enter total units consumed in the month: 163
        Your bill amount is Rs. 119.50

12. Write a program that inputs a three- digits integer and displays it as an integer in ascending order of its individual digits.

    Sample output of the program is given below:
    Enter the 3-digit integer: 291
    129
    Enter the 3-digit integer: 551
    155

Enter the 3-digit integer: 501
15
Enter the 3-digit integer: 062
The number is invalid
Enter the 3-digit integer: 3214
The number is invalid

13. Write a program to calculate the sum of all numbers from 1 to 100 using a for loop.

14. Develop a program that prints the first 10 Fibonacci numbers using a for loop.

15. Create a program that generates the multiplication table of a given number using a for loop.

16. Write a program to find the factorial of a given number using a for loop.

17. Develop a program that prompts the user to enter a string and then counts the number of vowels and consonants in that string using for loops and appropriate conditions.

18. Create a program to print the first N natural numbers in reverse order using a for loop.

19. Write a program to calculate the sum of all prime numbers between 1 and 1000 using a for loop and appropriate conditions.

20. Develop a program that prompts the user to enter a positive integer and then checks whether it is a Harshad number or not (i.e., divisible by the sum of its digits), using for loops and appropriate arithmetic operations.