PF LAB 03 ASSIGNMENT

- Age C code

SOURCE CODE

```c
#include<stdio.h>
int main () {
int age;
printf("Enter your age: ");
scanf("%d", &age);
    if (age>=18)
    printf("License should be issued.");
    else
    printf("License must not be issued.");
    return 0;
}
```

OUTPUT

C:\Users\NLN\Desktop\c saffa\age.exe

Enter your age: 18
Licscense should be issued.

- Switch C code

SOURCE CODE

```c
#include<stdio.h>
int main () {
    int day;
    printf("Enter a number (1-7) to get the corresponding day of the week: ");
    scanf("%d",&day);
    switch(day) {
    case 1:
        printf("Monday\n");
        break;
    case 2:
        printf("Tuesday\n");
        break;
    case 3:
        printf("Wednesday\n");
        break;
    case 4:
```

```c
            printf("Thursday\n");
            break;
    case 5:
            printf("Friday\n");
            break;
    case 6:
            printf("Saturday\n");
            break;
    case 7:
            printf("Sunday\n");
            break;
            default:
                    printf("Invalid input. Enter a number btw 1 and 7.");
    }
            return 0;
    }
```

OUTPUT

C:\Users\NLN\Desktop\c saffa\switch.exe

```
Enter a number (1-7) to get the corresponding day of the week: 2
Tuesday
```

1. Write a C program to check whether a number is multiple of 3 or not. If it is then print "This number is multiple of 3", otherwise print "This number is not multiple of 3".

SOURCE CODE
```c
#include<stdio.h>
int main () {
int a, r;
printf("Enter a number (a): ");
scanf("%d",&a);
r=a%3;
if(r==0)
printf("a is the multiple of 3.");
else
printf("a is not the multiple of 3.");
return 0;
}
```

OUTPUT


```
C:\Users\NLN\Desktop\c saffa\labtask 1.exe
Enter a number (a): 15
a is the multiple of 3.
```

2. Create a calculator asking for operator (+ or – or * or /) and operands and performs calculation according to the user input using switch statement.

SOURCE CODE
```c
#include<stdio.h>
int main ()  {
int num1, num2;
char op;
printf("Enter number 1: ");
scanf("%d", &num1);
printf("Enter number 2: ");
scanf("%d", &num2);
printf("Enter an operator of your choice (+, -, *, /): ");
scanf(" %c",&op);
switch (op) {
case '+':
 printf("Addition of two numbers: %d", num1+num2);
 break;
case '-':
```

```
 printf("Subtraction of two numbers: %d", num1-num2);
 break;
   case '*':
 printf("Multiplication of two numbers: %d", num1*num2);
 break;
case '/':
 printf("Division of two numbers: %d", num1/num2);
 break;
default:
 printf("Invalid operator.");
}
return 0;
}
```

OUTPUT

C:\Users\NLN\Desktop\c saffa\labtask 2.exe

```
Enter number 1: 3
Enter number 2: 4
Enter an operator of your choice (+,-,*,/): *
Multiplication of two numbers: 12
```

3. Write a C program to input a character from the user and check whether the given character is a small alphabet, capital alphabet, digit, or special character, using if else.
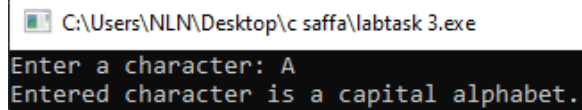
SOURCE CODE
```
#include<stdio.h>
int main () {
  char ch;
  printf("Enter a character: ");
  scanf(" %c", &ch);
  if(ch>='a' && ch<='z')
  printf("Entered character is a small alphabet.");
  else if(ch>='A' && ch<='Z')
  printf("Entered character is a capital alphabet.");
  else if(ch>='0' && ch<='9')
  printf("Entered character is a digit.");
  else
  printf("Entered character is a special character.");
  return 0;
}
```

OUTPUT
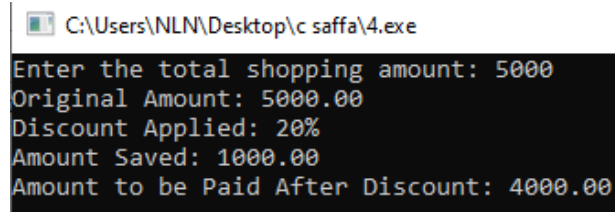
4. An online shopping store is providing discounts on the items due to the Eid. If the cost of items is less than 2000 it will give a discount up to 5%. If the cost of shopping is 2000 to 4000, a 10% discount will be applied. If the cost of shopping is 4000 to 6000, a 20% discount will be applied. If it's more than 6000 then a 35% discount will be applied to the cost of shopping. Print the actual amount, saved amount and the amount after discount. The Minimum amount eligible for a discount is 500.

SOURCE CODE

```c
#include <stdio.h>
int main () {
    float cost, discount = 0, savedAmount, finalAmount;
    printf("Enter the total shopping amount: ");
    scanf("%f", &cost);
    if (cost >= 500) {
        if (cost < 2000)
            discount = 5;
        } else if (cost >= 2000 && cost < 4000) {
            discount = 10;
        } else if (cost >= 4000 && cost < 6000) {
            discount = 20;
        } else if (cost >= 6000) {
            discount = 35;
        }
        savedAmount = (discount / 100) * cost;
        finalAmount = cost - savedAmount;
        printf("Original Amount: %.2f\n", cost);
        printf("Discount Applied: %.0f%%\n", discount);
        printf("Amount Saved: %.2f\n", savedAmount);
        printf("Amount to be Paid After Discount: %.2f\n", finalAmount);
    } else {
        printf("No discount applicable. Minimum amount eligible for discount is 500.\n");
        printf("Amount to be Paid: %.2f\n", cost);
    }
return 0;
}
```

OUTPUT

```
Enter the total shopping amount: 5000
Original Amount: 5000.00
Discount Applied: 20%
Amount Saved: 1000.00
Amount to be Paid After Discount: 4000.00
```

5. Write a program in C to calculate and print the electricity bill of a given customer. The customer id., name and unit consumed by the user should be taken from the keyboard and display the total amount to pay to the customer. If the bill exceeds Rs. 18000 then a surcharge of 15% will be charged on top of the bill.

The charges are as follow:

Unit	Charge/Unit
Up to 199	@16.20
200 and above but less than 300	@20.10
300 and above but less than 500	@27.10
500 and above	@35.90

SOURCE CODE
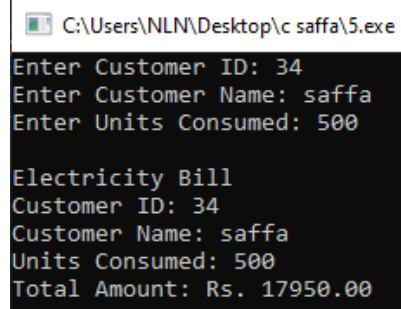
```c
#include <stdio.h>
int main () {
    int customer_id, units;
    char name[20];
    float total_amount, surcharge = 0;
    printf("Enter Customer ID: ");
    scanf("%d", &customer_id);
    printf("Enter Customer Name: ");
    scanf("%s", name);
    printf("Enter Units Consumed: ");
    scanf("%d", &units);
    if (units <= 199) {
        total_amount = units * 16.20;
    } else if (units >= 200 && units < 300) {
        total_amount = units * 20.10;
    } else if (units >= 300 && units < 500) {
        total_amount = units * 27.10;
    } else {
        total_amount = units * 35.90;
    }
    if (total_amount > 18000) {
        surcharge = total_amount * 0.15;
```

```c
        total_amount += surcharge;
    }
    printf("\nElectricity Bill\n");
    printf("Customer ID: %d\n", customer_id);
    printf("Customer Name: %s\n", name);
    printf("Units Consumed: %d\n", units);
    printf("Total Amount: Rs. %.2f\n", total_amount);
}
```

OUTPUT


```
C:\Users\NLN\Desktop\c saffa\5.exe
Enter Customer ID: 34
Enter Customer Name: saffa
Enter Units Consumed: 500

Electricity Bill
Customer ID: 34
Customer Name: saffa
Units Consumed: 500
Total Amount: Rs. 17950.00
```

6. Given a positive integer denoting n, do the following:

a. If 1<=n<=9, print lowercase English words corresponding to the numbers e.g. (one for 1, two for 2)

b. If n>9 print greater then 9.

SOURCE CODE

```c
#include <stdio.h>
int main() {
    int n;
    printf("Enter a number: ");
    scanf("%d", &n);
    if (n >= 1 && n <= 9) {
        if (n == 1) {
            printf("one");
        } else if (n == 2) {
            printf("two");
        } else if (n == 3) {
            printf("three");
        } else if (n == 4) {
            printf("four");
        } else if (n == 5) {
            printf("five");
        } else if (n == 6) {
```
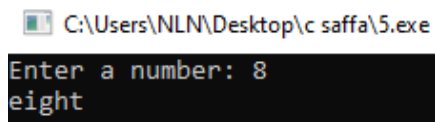
```c
        printf("six");
    } else if (n == 7) {
        printf("seven");
    } else if (n == 8) {
        printf("eight");
    } else if (n == 9) {
        printf("nine");
    }
  }
  else if (n > 9) {
    printf("greater than 9");
  }
return 0;
 }
```

OUTPUT

```
Enter a number: 8
eight
```

7. An android developer wants to design a mobile feature to control the brightness of the mobile phone according to the surrounding light. In order to do it he uses an ambient light sensor (for the detection of surrounding light) which is commonly built in in all major android phones. It gives the value of light intensity in integers. Write a C program for Light sensor value ranges from 0-1000, if it's exposed under sunshine (>500), if it's evening then (0 ~ 100), lighting (100 to 500).

SOURCE CODE

```c
#include <stdio.h>
int main() {
    int lightSensorValue;
    printf("Enter the light sensor value (0-1000): ");
    scanf("%d", &lightSensorValue);
    if (lightSensorValue < 0 || lightSensorValue > 1000) {
        printf("Invalid input. Light sensor value must be between 0 and 1000.\n");
    } else {
        if (lightSensorValue > 500) {
            printf("It's sunshine.\n");
        } else if (lightSensorValue >= 0 && lightSensorValue <= 100) {
            printf("It's evening.\n");
        } else if (lightSensorValue > 100 && lightSensorValue <= 500) {
```
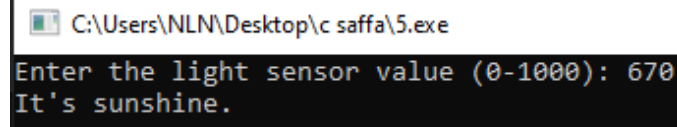
```c
        printf("It's lighting.\n");
    } else {
        printf("Unknown light condition.\n");
    }
  }
return 0;
}
```

OUTPUT

```
Enter the light sensor value (0-1000): 670
It's sunshine.
```

8. Write a program to see greetings according to time using a 24-hour format. If the time between is 5 to 11 it should greet "Good Morning", if time is between 12 to 18 it should greet "Good Evening", if time between 18 to 24 it should greet "Good Night".
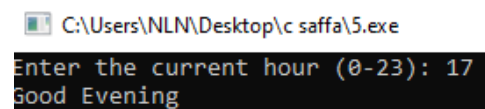
SOURCE CODE
```c
#include <stdio.h>
int main() {
    int hour;
    printf("Enter the current hour (0-23): ");
    scanf("%d", &hour);
    if (hour < 0 || hour > 23) {
        printf("Invalid hour. Please enter a value between 0 and 23.");
        return 1;
    }
    if (hour >= 5 && hour < 12) {
        printf("Good Morning");
    } else if (hour >= 12 && hour < 19) {
        printf("Good Evening");
    } else {
        printf("Good Night");
    }
 return 0;
}
```

OUTPUT

```
Enter the current hour (0-23): 17
Good Evening
```

9. Write a program in which user enters his NTS and F.Sc marks and your program will help student in selection of university. Based on these marks Student will be allocated a seat at different department of different university.

a) Oxford University: IT:

a. Above 70% in Fsc. and 70 % in NTS

b. Electronics: Above 70% in Fsc. and 60 % in NTS

c. Telecommunication: Above 70% in Fsc. and 50 % in NTS Basic Decision Structures Programming Fundamentals Lab Lab 03 Page 2 of 15

b) MIT:

a. IT: 70% - 60 % in Fsc. and 50 % in NTS

b. Chemical: 59% – 50 % in Fsc. and 50 % in NTS

c. Computer: Above 40% and below 50 % in Fsc. and 50 % in NTS

SOURCE CODE

```c
#include <stdio.h>
int main() {
    float fscMarks, ntsMarks;
    printf("Enter your F.Sc. marks (out of 100): ");
    scanf("%f", &fscMarks);
    printf("Enter your NTS marks (out of 100): ");
    scanf("%f", &ntsMarks);
    float fscPercentage = fscMarks;
    float ntsPercentage = ntsMarks;
    printf("Based on your marks, you are eligible for the following: ");
    if (fscPercentage > 70) {
        if (ntsPercentage >= 70) {
            printf("Oxford University: IT\n");
        } else if (ntsPercentage >= 60) {
            printf("Oxford University: Electronics\n");
        } else if (ntsPercentage >= 50) {
            printf("Oxford University: Telecommunication\n");
        }
    }
    if (fscPercentage > 60 && fscPercentage <= 70) {
        if (ntsPercentage >= 50) {
            printf("MIT: IT\n");
        }
    } else if (fscPercentage >= 50 && fscPercentage < 60) {
        if (ntsPercentage >= 50) {
            printf("MIT: Chemical\n");
        }
```

```c
    } else if (fscPercentage > 40 && fscPercentage <= 50) {
        if (ntsPercentage >= 50) {
            printf("MIT: Computer\n");
        }
    }
    return 0;
}
```

OUTPUT

```
Enter your F.Sc. marks (out of 100): 86
Enter your NTS marks (out of 100): 78
Based on your marks, you are eligible for the following: Oxford University: IT
```

10. Write a C program that takes the temperature as input from the user and prints a message based on the temperature range:

a) Temperature < 0: "Freezing weather"

b) 0 to 10: "Very cold weather"

c) 11 to 20: "Cold weather"

d) 21 to 30: "Normal temperature"

e) 31 to 40: "Hot weather"

f) 40: "Very hot weather".

SOURCE CODE

```c
#include <stdio.h>
int main() {
    float temperature;
    printf("Enter the temperature: ");
    scanf("%f", &temperature);
    if (temperature < 0) {
        printf("Freezing weather");
    } else if (temperature >= 0 && temperature <= 10) {
        printf("Very cold weather");
    } else if (temperature >= 11 && temperature <= 20) {
        printf("Cold weather");
    } else if (temperature >= 21 && temperature <= 30) {
        printf("Normal temperature");
    } else if (temperature >= 31 && temperature < 40) {
        printf("Hot weather");
    } else if (temperature == 40) {
        printf("Very hot weather");
```

```
    } else {
        printf("Temperature exceeds the specified range");
    }}
```

OUTPUT

C:\Users\NLN\Desktop\c saffa\5.exe

```
Enter the temperature: 40
Very hot weather
```

FLOWCHARTS (first 5 programs)

```
                    ┌─────────┐
                    │  Start  │
                    └─────────┘
                         │
                         ▼
              ╱───────────────────────╱
             ╱   Enter a number - a   ╱
            ╱───────────────────────╱
                         │
                         ▼
                 ┌───────────────┐
                 │    r = a% 3   │
                 └───────────────┘
                         │
                         ▼
                  ◇─────────────◇
                 ╱               ╲                ╱───────────────────────────────────────╱
                ◇   if (r==0)     ◇─────────────▶╱   Print 'a is not the multiple of 3'  ╱
                 ╲               ╱              ╱───────────────────────────────────────╱
                  ◇─────────────◇                                    │
                         │                                           │
                         ▼                                           │
       ╱─────────────────────────────────╱                          │
      ╱   Print 'a is the multiple of 3' ╱                          │
     ╱─────────────────────────────────╱                           │
                         │                                           │
                         ▼                                           │
                    ┌─────────┐                                      │
                    │   End   │◀─────────────────────────────────────┘
                    └─────────┘
```

```
                    ┌─────────┐
                    │  Start  │
                    └─────────┘
                         │
                         ▼
        ╱───────────────────────────────────╲
       ╱  Enter two numbers (num1,  num2)     ╲
      ╱───────────────────────────────────────╲
                         │
                         ▼
         ╱─────────────────────────╲
        ╱   Enter an operator of     ╲
       ╱    your choice (+, -, *, /)  ╲
      ╱───────────────────────────────╲
                         │
                         ▼
                ┌─────────────────┐
                │   Switch (op)   │
                └─────────────────┘
                         │
                         ▼
              ╱─────────────╲        ┌──────────────────────────┐
             ╱   Case '+'    ╲──────▶│  Addition of two numbers │──────────┐
             ╲               ╱       │      num1 + num2         │          │
              ╲─────────────╱        └──────────────────────────┘          │
                    │                                                       │
                    ▼                                                       │
              ╱─────────────╲        ┌──────────────────────────┐          │
             ╱   Case '-'    ╲──────▶│ Subtraction of two numbers│─────────│
             ╲               ╱       │      num1 - num2         │          │
              ╲─────────────╱        └──────────────────────────┘          │
                    │                                                       │
                    ▼                                                       │
              ╱─────────────╲        ┌────────────────────────────┐        │
             ╱   Case '*'    ╲──────▶│ Multiplication of two numbers│──────│
             ╲               ╱       │       num1 * num2          │        │
              ╲─────────────╱        └────────────────────────────┘        │
                    │                                                       │
                    ▼                                                       │
              ╱─────────────╲        ┌──────────────────────────┐          │
             ╱   Case '/'    ╲──────▶│  Division of two numbers │──────────│
             ╲               ╱       │      num1 / num2         │          │
              ╲─────────────╱        └──────────────────────────┘          │
                    │                                                       ▼
                    │              ┌────────────────────────────┐      ╱─────────────╲
                    └─────────────▶│ Default: 'Invalid Operator' │────▶│  End switch   │
                                   └────────────────────────────┘      ╲─────────────╱
                                                                              │
                                                                              ▼
                                                                         ╱─────────╲
                                                                        │    End    │
                                                                         ╲─────────╱
```

```
                    ┌─────────┐
                    │  Start  │
                    └────┬────┘
                         │
                         ▼
          ╱─────────────────────────────╲
          │   Enter a character - ch     │
          ╲─────────────────────────────╱
                         │
                         ▼
                   ╱───────────╲              ╱─────────────────────────────╲
                  ╱  if (ch >= 'a' ╲──────────▶│   Print 'Entered character is │
                  ╲  && ch<= 'z')  ╱           │     a small alphabet'        │
                   ╲───────────╱              ╲─────────────────────────────╱
                         │
                         ▼
                   ╱───────────╲              ╱─────────────────────────────╲
                  ╱ else if (ch >= 'A' ╲──────▶│   Print 'Entered character is │
                  ╲  && ch<= 'Z')   ╱          │     a capital alphabet'      │
                   ╲───────────╱              ╲─────────────────────────────╱
                         │
                         ▼
                   ╱───────────╲              ╱─────────────────────────────╲
                  ╱ else if (ch >= '0' ╲──────▶│   Print 'Entered character is │
                  ╲  && ch<= '9')   ╱          │          a digit'            │
                   ╲───────────╱              ╲─────────────────────────────╱
                         │
                         ▼
          ┌─────────────────────────────┐
          │  else 'Entered character is  │
          │    a special character'      │
          └──────────────┬──────────────┘
                         │
                         ▼
                    ┌─────────┐
                    │   End   │
                    └─────────┘
```

```
                              ┌─────────┐
                              │  Start  │
                              └────┬────┘
                                   │
                    ┌──────────────┴──────────────┐
                    │  float cost, savedAmount,    │
                    │        finalAmount           │
                    └──────────────┬──────────────┘
                                   │
                         ┌─────────┴─────────┐
                         │   discount = 0    │
                         └─────────┬─────────┘
                                   │
                  ╱────────────────┴────────────────╲
                  │  Enter the total shopping amount │
                  ╲────────────────┬────────────────╱
                                   │
                            ◇ if(cost>=500) ◇
```

- if(cost>=500)
  - **TRUE**
    - if(cost<2000)
      - **TRUE** → discount=5
      - **FALSE** → else if(cost>=2000 && cost<4000)
        - discount = 10
        - else if(cost>=4000 && cost<6000)
          - discount = 20
          - else if(cost>=6000)
            - discount = 35
  - **FALSE** → else
    - Output 'No discount applicable'.
    - Output 'Amount to be paid', cost

- savedAmount = (discount/100)*cost
- finalAmount = cost - savedAmount
- Output 'Original Amount', cost
- Output 'Discount Applied', discount
- Output 'Amount Saved', savedAmount
- Output 'Amount to be paid after discount', finalAmount

End

```
                    ┌──────────┐
                    │  Start   │
                    └────┬─────┘
                         │
                         ▼
              ┌────────────────────────┐
              │  int customer_id, units, │
              │     char name [20]       │
              └────────────┬───────────┘
                           │
                           ▼
              ┌────────────────────────────┐
              │ float totalAmount, surcharge = 0 │
              └────────────┬───────────────┘
                           │
                           ▼
                 ╱ Enter customer ID ╱
                           │
                           ▼
                 ╱ Enter customer name ╱
                           │
                           ▼
                 ╱ Enter units consumed ╱
                           │
                           ▼
                ◇ if(units<=199) ◇────────►  totalAmount = units * 16.20
                           │
                           ▼
                ◇ else if (units>=200 ◇────►  totalAmount = units * 20.10
                  && units<300)
                           │
                           ▼
                ◇ else if (units>=300 ◇────►  totalAmount = units * 27.10
                  && units<500)
                           │
                           ▼
                   ◇ else ◇──────────────►  totalAmount = units * 27.10
                           │
                           ▼
                 ╱ Print 'Customer ID' ╱
                           │
                           ▼
                 ╱ Print 'Customer Name' ╱
                           │
                           ▼
                 ╱ Print 'Units Consumed' ╱
                           │
                           ▼
                 ╱ Print 'Total Amount' ╱
                           │
                           ▼
                    ┌──────────┐
                    │   End    │
                    └──────────┘
```