Course Name:	**Structured Programming methodology**	**Semester:**	**I**
Date of Performance:	**23/9/2025**	**DIV/ Batch No:**	**A1**
Student Name:	**Arav Arun**	**Roll No:**	**16010125013**

Experiment No: 2
Title: Use of decision-making control structures

Aim and Objective of the Experiment:

Write a program in C++ to demonstrate the use of decision-making and branching control structures

COs to be achieved:

CO2: Demonstrate the use of control structures

Theory:

An if-else statement is a conditional statement that executes a different set of statements based on the condition that is true or false.

Syntax :

```
if (condition) {
    //code
}
else {
    //code
}
```

A switch statement is a conditional statement used to check the value of a variable and compare it with all the cases. If the value is matched with any case, then its corresponding statements will be executed.

Syntax :

```
switch (expression) {
   case value1:

      break;
   case value2:

      break;
   default:
}
```

Problem Statements:

Write a program for the following:

1. The marks obtained by a student in a subject are entered through the keyboard. The program should calculate the student's grade based on their marks using if–else statements.

   The grades are awarded as follows:

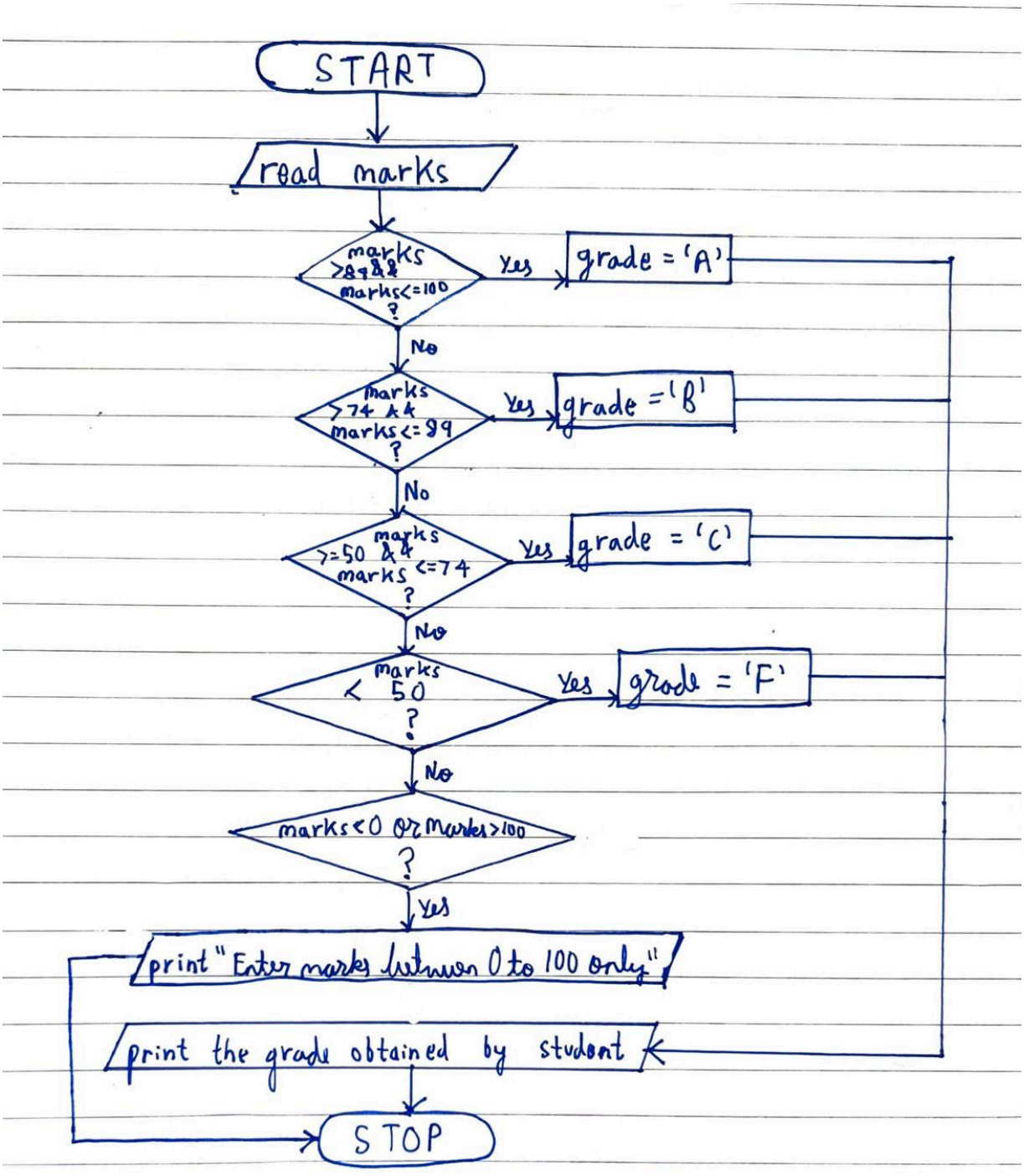
Score in subject	Grade
90-100	A
75-89	B
50-74	C
<50	F

2. Enter a number (1–7) through the keyboard and display the corresponding **day of the week** using switch case statements.

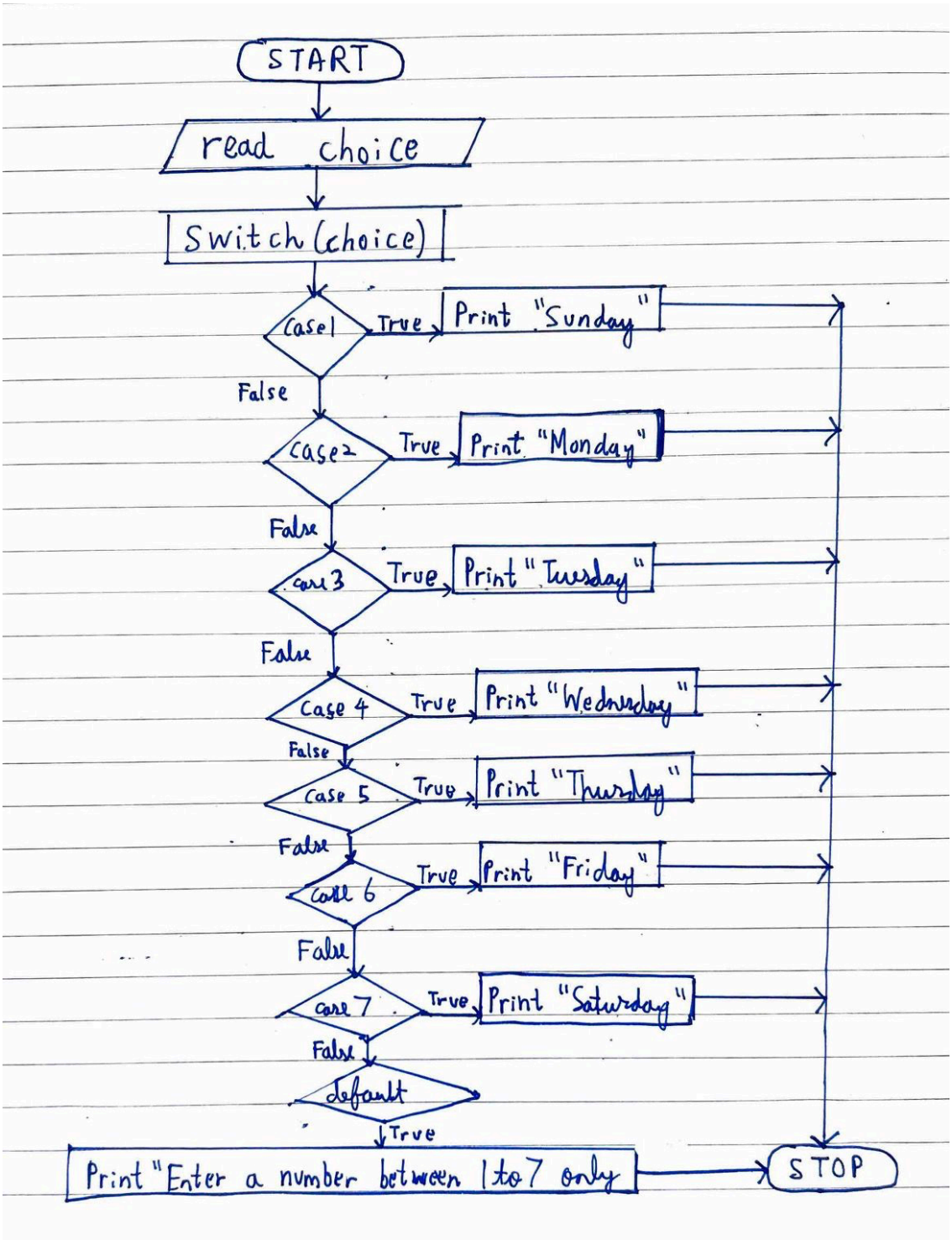
Number	Day
1.	Sunday
2.	Monday
3.	Tuesday
4.	Wednesday
5.	Thursday
6.	Friday
7.	Saturday

Flow chart:

Flow chart for program 1 :



Flow chart for program 2 :



Code:

Program 1 :

```
#include <iostream>
using namespace std;

int main()
{
   double marks = 0;
   char grade = 0;
   cout << "Enter marks obtained by student : " << endl;
   cin>>marks;

   if(marks>89&&marks<=100)
      grade = 'A';
   else if(marks>74&&marks<=89)
      grade = 'B';
   else if(marks>=50&&marks<=74)
      grade = 'C';
   else if(marks<50)
      grade = 'F';
   else if(marks<0||marks>100)
   {
      cout<<"Enter marks between 0 to 100 only"<<endl;
      return 0;
   }
   cout<<"The grade obtained by the student is :"<<grade<<endl;
   return 0;
}
```

Program 2 :

```
#include <iostream>
using namespace std;

int main()
{
   int choice=0;
   cout << "Enter a number between 1 to 7"<<endl;
   cin>>choice;
```

```
   switch(choice)
   {
      case 1:
         cout<<"Sunday";
      break;
      case 2:
         cout<<"Monday";
      break;
      case 3:
         cout<<"Tuesday";
      break;
      case 4:
         cout<<"Wednesday";
      break;
      case 5:
         cout<<"Thursday";
      break;
      case 6:
         cout<<"Friday";
      break;
      case 7:
         cout<<"Saturday";
      break;
      default:
         cout<<"Enter a number between 1 to 7 only";
      break;
   }
   return 0;
}
```

Output:

Program 1 Output :

```
Enter marks obtained by student :
99
The grade obtained by the student is :A

Process returned 0 (0x0)   execution time : 2.642 s
Press any key to continue.
```

```
Enter marks obtained by student :
76
The grade obtained by the student is :B

Process returned 0 (0x0)   execution time : 1.842 s
Press any key to continue.
```

```
Enter marks obtained by student :
52
The grade obtained by the student is :C

Process returned 0 (0x0)   execution time : 2.338 s
Press any key to continue.
```

```
Enter marks obtained by student :
30
The grade obtained by the student is :F

Process returned 0 (0x0)   execution time : 1.953 s
Press any key to continue.
```

```
Enter marks obtained by student :
200
Enter marks between 0 to 100 only

Process returned 0 (0x0)   execution time : 2.559 s
Press any key to continue.
```

Program 2 Output :

```
Enter a number between 1 to 7 :
1
Sunday
Process returned 0 (0x0)   execution time : 5.444 s
Press any key to continue.
```

```
Enter a number between 1 to 7 :
2
Monday
Process returned 0 (0x0)   execution time : 1.454 s
Press any key to continue.
```

```
Enter a number between 1 to 7 :
3
Tuesday
Process returned 0 (0x0)   execution time : 3.840 s
Press any key to continue.
```

```
Enter a number between 1 to 7 :
4
Wednesday
Process returned 0 (0x0)   execution time : 2.374 s
Press any key to continue.
```

```
Enter a number between 1 to 7 :
5
Thursday
Process returned 0 (0x0)   execution time : 1.480 s
Press any key to continue.
```

```
Enter a number between 1 to 7 :
6
Friday
Process returned 0 (0x0)   execution time : 1.509 s
Press any key to continue.
```

```
Enter a number between 1 to 7 :
7
Saturday
Process returned 0 (0x0)   execution time : 1.409 s
Press any key to continue.
```

```
Enter a number between 1 to 7 :
8
Enter a number between 1 to 7 only
Process returned 0 (0x0)   execution time : 1.605 s
Press any key to continue.
```

Post Lab Subjective/Objective type Questions:

1.Write a C++ program to ask the user to input a number. Check whether the number is even or odd.
Solve the problem using:

- **if–else statement**
- **Ternary operator**

Sol:

```
#include <iostream>
using namespace std;

int main() {
   int num;
   cout << "Enter a number: ";
   cin >> num;

   cout<<"Using if-else statement : "<<endl;
   if (num % 2 == 0) {
      cout << num << " is even." << endl;
   } else {
      cout << num << " is odd." << endl;
   }
   cout<<"Using ternary operator : "<<endl;
   string result = (num % 2 == 0) ? "even" : "odd";
   cout << num << " is " << result << endl;
   return 0;
}
```

Output:

```
Enter a number: 4
Using if-else statement
4 is even.
Using ternary operator
4 is even
```

2.Write program to demonstrate the use of Switch case and if else ladder.

Sol:

```
#include <iostream>
using namespace std;

int main() {
    double num1, num2;
    char op;

    cout << "Enter first number: ";
```

```
    cin >> num1;
    cout << "Enter an operator (+, -, *, /): ";
    cin >> op;
    cout << "Enter second number: ";
    cin >> num2;

    cout << "Using if-else ladder: ";
    if(op == '+')
        cout << num1 << " + " << num2 << " = " << num1 + num2 << endl;
    else if(op == '-')
        cout << num1 << " - " << num2 << " = " << num1 - num2 << endl;
    else if(op == '*')
        cout << num1 << " * " << num2 << " = " << num1 * num2 << endl;
    else if(op == '/')
    {
        if(num2 != 0)
            cout << num1 << " / " << num2 << " = " << num1 / num2 << endl;
        else
            cout << "Error: Division by zero!" << endl;
    }
    else
        cout << "Invalid operator!" << endl;

    cout << "Using switch-case: ";
    switch(op) {
        case '+': cout << num1 << " + " << num2 << " = " << num1 + num2 << endl; break;
        case '-': cout << num1 << " - " << num2 << " = " << num1 - num2 << endl; break;
        case '*': cout << num1 << " * " << num2 << " = " << num1 * num2 << endl; break;
        case '/':
            if(num2 != 0)
                cout << num1 << " / " << num2 << " = " << num1 / num2 << endl;
            else
                cout << "Error: Division by zero!" << endl;
            break;
        default: cout << "Invalid operator!" << endl;
    }

    return 0;
}
```

Output:

```
Enter first number: 3
Enter an operator (+, -, *, /): /
Enter second number: 6
Using if-else ladder: 3 / 6 = 0.5
Using switch-case: 3 / 6 = 0.5
```

Conclusion:

In this experiment, I got hands-on experience with decision making and branching in C++. I used if else and switch case statements to handle different situations, like calculating grades, figuring out the day of the week, and checking if a number is even or odd. I also learned how to use the ternary operator for simpler decisions. Overall, this experiment helped me understand how programs can make choices and respond dynamically to different inputs.

Signature of faculty in-charge with Date: