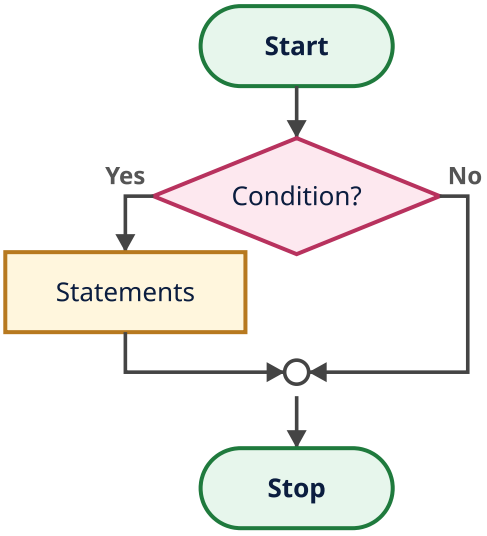
G.C.E. O/L Grade 11 ICT · Lesson 1

1.6 Selection: If–EndIf, If–Else–EndIf and Case

Syllabus 10.6. Selection lets a program make decisions. There are three forms: **If–EndIf** (do something only when a condition is true), **If–Else–EndIf** (choose between two paths) and **Case** (choose one of many options). For each one we go **flowchart → pseudocode → Pascal and Python code**.

1. If–EndIf (one-way selection)

If the condition is **True**, the statements inside run. If it is **False**, they are **skipped** and the program continues after ENDIF.



General form of If–EndIf

General pseudocode

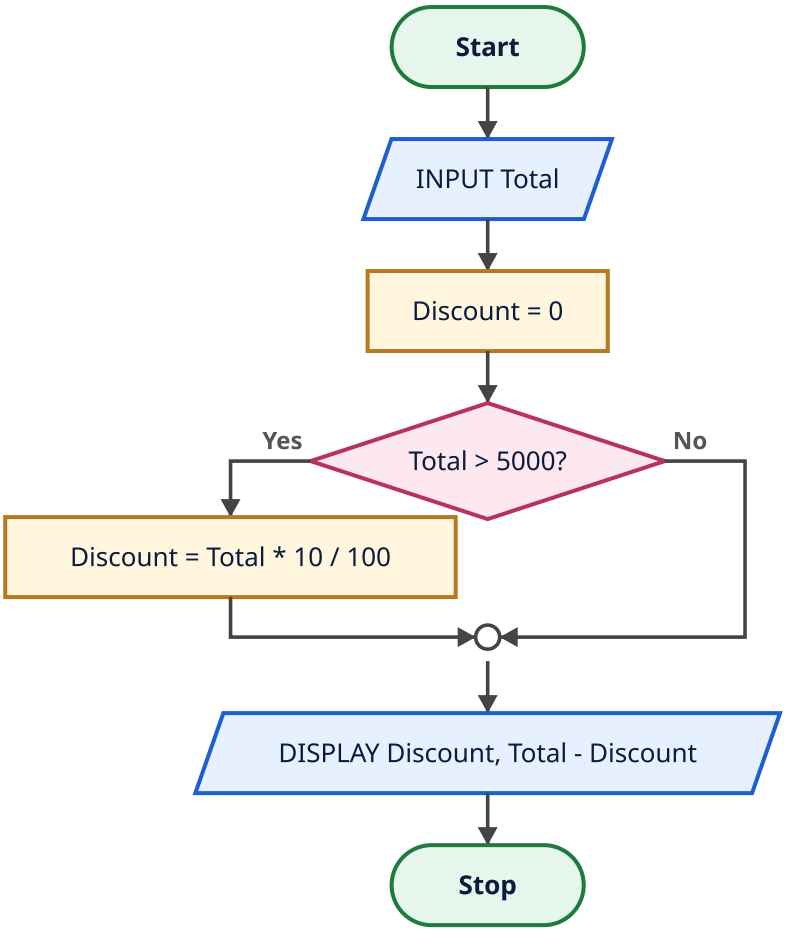
```
IF condition THEN
  statements
ENDIF
```

Example: a shop in Galle gives a **10% discount** when the bill is **more than Rs. 5000**.

Pseudocode

```
BEGIN
  INPUT Total
  Discount = 0
  IF Total > 5000 THEN
    Discount = Total * 10 / 100
  ENDIF
  DISPLAY Discount, Total - Discount
END
```

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Flowchart – If–EndIf: 10% discount on a bill over Rs. 5000

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If–EndIf: 10% discount on a bill over Rs. 5000

Pascal

```
program BillDiscount;
var
  total, discount: integer;
begin
  write('Enter bill total (Rs.): ');
  readln(total);
  discount := 0;
  if total > 5000 then
    discount := total * 10 div 100;
  writeln('Discount = Rs. ', discount);
  writeln('Amount to pay = Rs. ', total - discount);
end.
```

Python

```
total = int(input("Enter bill total (Rs.): "))
discount = 0
if total > 5000:
    discount = total * 10 // 100
print("Discount = Rs.", discount)
print("Amount to pay = Rs.", total - discount)
```

Sample run 1

```
Enter bill total (Rs.): 6500
Discount = Rs. 650
Amount to pay = Rs. 5850
```

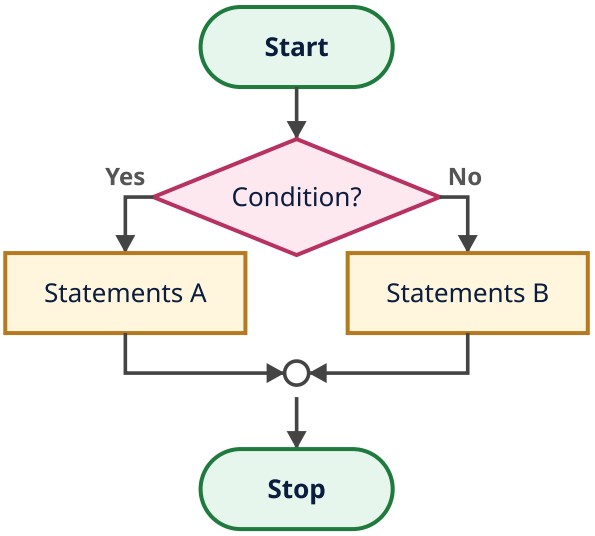
Sample run 2

```
Enter bill total (Rs.): 3000
Discount = Rs. 0
Amount to pay = Rs. 3000
```

2. If–Else–EndIf (two-way selection)

Exactly **one of two** groups of statements runs: the THEN part if the condition is True, the ELSE part if it is False.

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General form of If–Else–EndIf

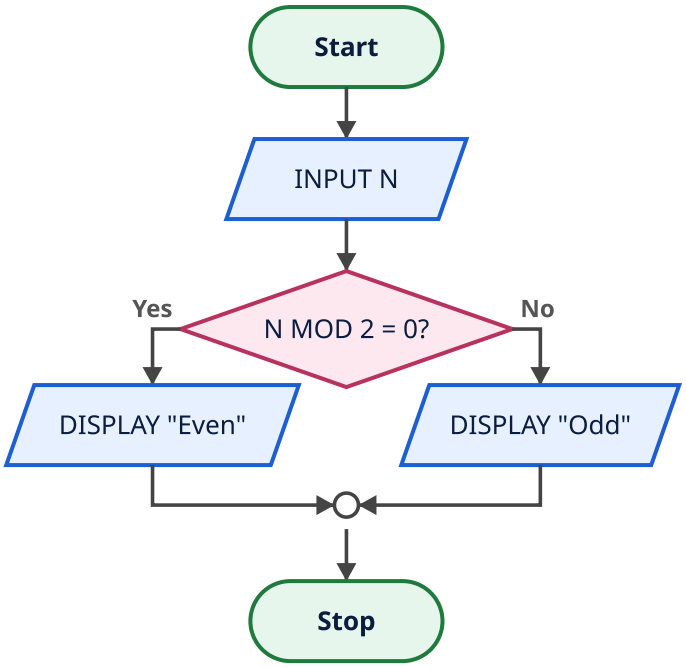
General pseudocode

```
IF condition THEN
  statements A
ELSE
  statements B
ENDIF
```

Pseudocode

```
BEGIN
  INPUT N
  IF N MOD 2 = 0 THEN
    DISPLAY "Even"
  ELSE
    DISPLAY "Odd"
  ENDIF
END
```

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Flowchart – If–Else–EndIf: even or odd

If–Else–EndIf: even or odd

Pascal

```
program EvenOdd;
var
  n: integer;
begin
  write('Enter a number: ');
  readln(n);
  if n mod 2 = 0 then
    writeln(n, ' is even')
  else
    writeln(n, ' is odd');
end.
```

Python

```
n = int(input("Enter a number: "))
if n % 2 == 0:
    print(n, "is even")
else:
    print(n, "is odd")
```

Sample run 1

```
Enter a number: 14
14 is even
```

Sample run 2

```
Enter a number: 7
7 is odd
```

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> 💡 Pascal trap: **never put a semicolon before else**. Write writeln('even') else … not writeln('even'); else … – the semicolon ends the whole if statement and the compiler gives an error. Python instead uses a colon : and **indentation** (4 spaces).

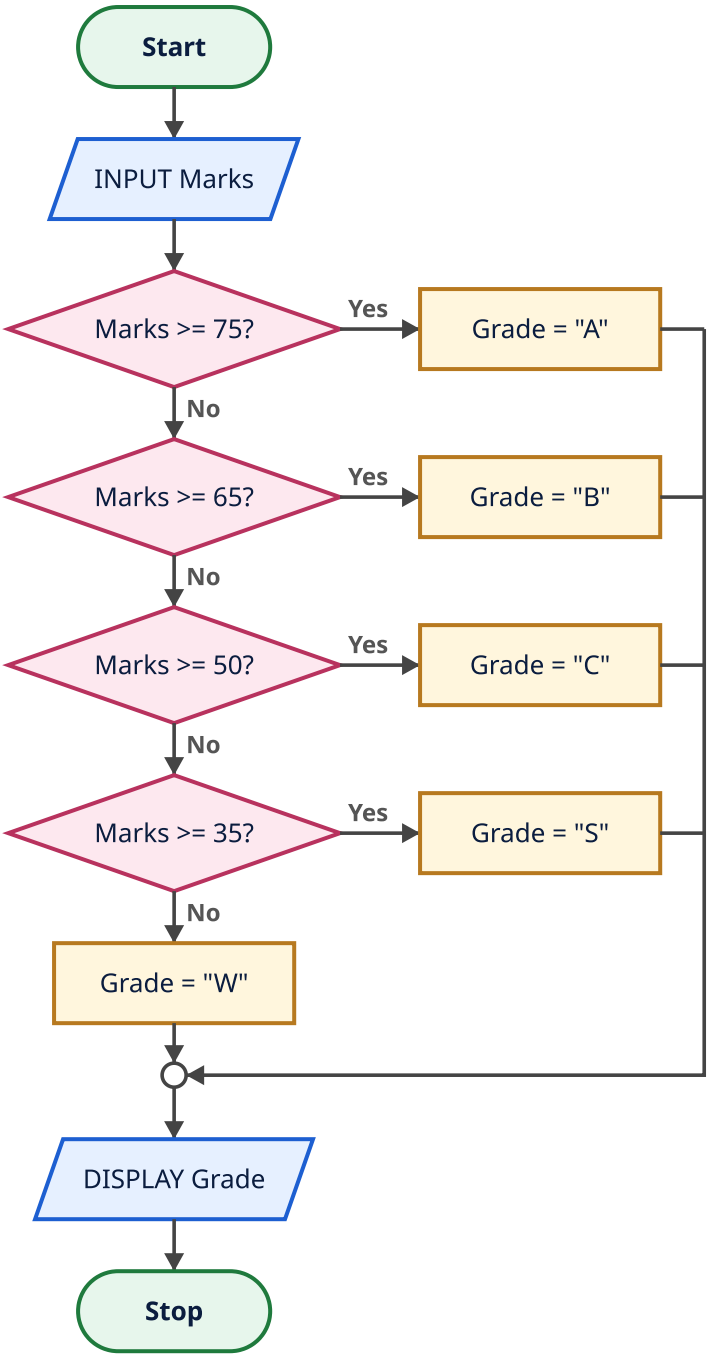
3. Many choices: IF … ELSE IF (O/L grades)

When there are more than two paths, we check conditions **one after another**. The first True condition wins and the rest are skipped. Sri Lankan O/L grades: A ≥ 75, B ≥ 65, C ≥ 50, S ≥ 35, otherwise W.

Pseudocode

```
BEGIN
  INPUT Marks
  IF Marks >= 75 THEN
    Grade = "A"
  ELSE IF Marks >= 65 THEN
    Grade = "B"
  ELSE IF Marks >= 50 THEN
    Grade = "C"
  ELSE IF Marks >= 35 THEN
    Grade = "S"
  ELSE
    Grade = "W"
  ENDIF
  DISPLAY Grade
END
```

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Flowchart – Marks to grade (A, B, C, S, W)

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Marks to grade (A, B, C, S, W)

Pascal

```
program MarksToGrade;
var
  marks: integer;
  grade: char;
begin
  write('Enter marks: ');
  readln(marks);
  if marks >= 75 then
    grade := 'A'
  else if marks >= 65 then
    grade := 'B'
  else if marks >= 50 then
    grade := 'C'
  else if marks >= 35 then
    grade := 'S'
  else
    grade := 'W';
  writeln('Grade: ', grade);
end.
```

Python

```
marks = int(input("Enter marks: "))
if marks >= 75:
    grade = "A"
elif marks >= 65:
    grade = "B"
elif marks >= 50:
    grade = "C"
elif marks >= 35:
    grade = "S"
else:
    grade = "W"
print("Grade:", grade)
```

Sample run 1

```
Enter marks: 82
Grade: A
```

Sample run 2

```
Enter marks: 58
Grade: C
```

Sample run 3

```
Enter marks: 30
Grade: W
```

4. Case (multi-way selection)

When one variable is compared with many **fixed values** (1, 2, 3…), **Case** is shorter and clearer than many IFs. Pascal uses **case … of … else … end**. Python (3.10 and later) uses **match … case**; case _

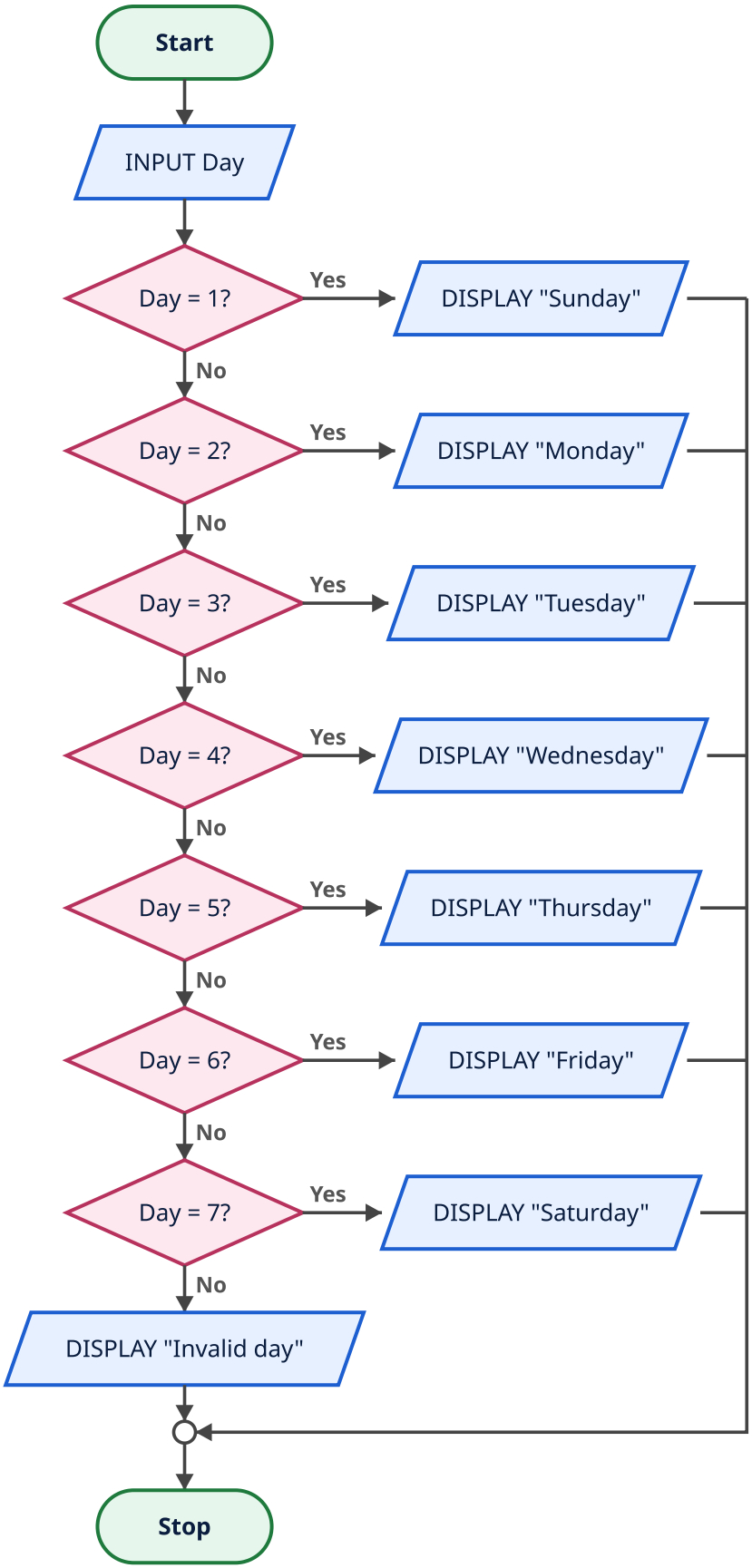
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means “anything else”.

Pseudocode

```
BEGIN
  INPUT Day
  CASE Day OF
    1 : DISPLAY "Sunday"
    2 : DISPLAY "Monday"
    3 : DISPLAY "Tuesday"
    4 : DISPLAY "Wednesday"
    5 : DISPLAY "Thursday"
    6 : DISPLAY "Friday"
    7 : DISPLAY "Saturday"
    OTHERWISE : DISPLAY "Invalid day"
  ENDCASE
END
```

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Flowchart – Case / switch: day number to day name

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Case / switch: day number to day name

Pascal

```
program DayName;
var
  day: integer;
begin
  write('Enter day number (1-7): ');
  readln(day);
  case day of
    1: writeln('Sunday');
    2: writeln('Monday');
    3: writeln('Tuesday');
    4: writeln('Wednesday');
    5: writeln('Thursday');
    6: writeln('Friday');
    7: writeln('Saturday');
  else
    writeln('Invalid day');
  end;
end.
```

Python

```
day = int(input("Enter day number (1-7): "))
match day:
    case 1:
        print("Sunday")
    case 2:
        print("Monday")
    case 3:
        print("Tuesday")
    case 4:
        print("Wednesday")
    case 5:
        print("Thursday")
    case 6:
        print("Friday")
    case 7:
        print("Saturday")
    case _:
        print("Invalid day")
```

Sample run 1

```
Enter day number (1-7): 3
Tuesday
```

Sample run 2

```
Enter day number (1-7): 9
Invalid day
```

5. From flowchart to code – the steps

1. Read the diamond
1. දියමන්තිය කියවන්න

2. Yes branch
2. ඔව් ශාඛාව

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3. No branch
3. නැත ශාඛාව

4. Where they join
4. ඒවා එක් වන තැන

5. Test both paths
5. මාර්ග දෙකම පරීක්ෂා කරන්න

Key Words

Selection – Choosing which statements run using a condition.

If–EndIf – Runs statements only when the condition is True.

If–Else–EndIf – Chooses one of two groups of statements.

Case – Chooses one of many options using fixed values.

THEN – Starts the part that runs when the condition is True.

ELSE – Starts the part that runs when the condition is False.

ENDIF – Marks the end of an IF in pseudocode.

match ... case – Python's case statement (Python 3.10+).

Indentation – Spaces at the start of a line; Python uses it to group statements.

Branch – One of the paths out of a decision.

Even number – A number with N mod 2 = 0.

Test data – Inputs chosen to check every path of a program.

Sample Q&A

1. What is the difference between If–EndIf and If–Else–EndIf?

> **Answer:** If–EndIf does something or nothing; If–Else–EndIf always does one of two things.

2. For a bill of Rs. 6500, what discount does the program give?

> **Answer:** Rs. 650; amount to pay Rs. 5850.

3. What grade does 58 get?

> **Answer:** C (≥ 50 but < 65).

4. When is Case better than many IFs?

> **Answer:** When one variable is compared with many fixed values.

5. What does the day program display for 9?

> **Answer:** Invalid day.

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6. Why must we test both paths of an IF?

> **Answer:** A mistake may be hidden in the path we did not test.

MCQ

1. In If–EndIf, when the condition is False…

A. an error occurs
B. the program stops
C. the statements run twice
D. the statements are skipped

2. If–Else–EndIf always runs…

A. the ELSE part only
B. exactly one of two parts
C. both parts
D. neither part

3. Bill Rs. 6500 with 10% discount over Rs. 5000. Amount to pay is…

A. Rs. 650
B. Rs. 5000
C. Rs. 5850
D. Rs. 6500

4. Bill Rs. 3000 in the same program. Discount is…

A. Rs. 0
B. Rs. 3000
C. Rs. 300
D. Rs. 30

5. The even/odd program shows “7 is odd” because…

A. 7 > 2
B. 7 mod 2 = 1
C. 7 mod 2 = 0
D. 7 div 2 = 3

6. The O/L grade for 82 marks is…

A. S
B. C
C. A
D. B

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7. The O/L grade for 30 marks is…

A. W
B. C
C. F
D. S

8. The O/L grade for 66 marks is…

A. A
B. B
C. C
D. S

9. Choosing a day name from a day number 1–7 is best done with…

A. Case
B. an array of Booleans
C. a FOR loop
D. a constant

10. Python’s case statement uses the words…

A. select … when
B. switch … case
C. match … case
D. case … of

11. In Pascal, what must NOT come just before else?

A. a new line
B. a space
C. writeln
D. a semicolon ;

12. Python groups the statements inside an if by…

A. brackets { }
B. semicolons
C. indentation
D. begin … end

13. In a flowchart, the Yes branch of a decision becomes the… part.

A. ELSE
B. THEN
C. CASE
D. ENDIF

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14. In Pascal case, the part for “any other value” is written…

A. otherwise only in Python
B. default
C. case _
D. else

15. To test a pass/fail program fully, use…

A. one passing and one failing mark
B. the same mark twice
C. only a passing mark
D. no input

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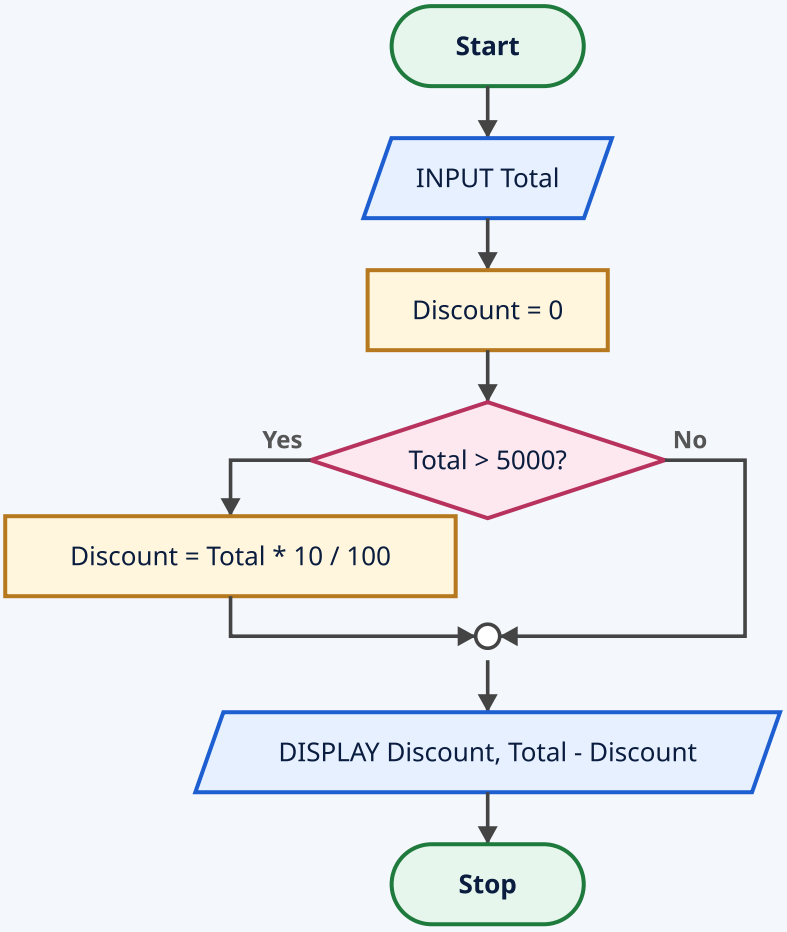
Structured Questions

1. A shop gives a 10% discount when the bill is more than Rs. 5000. (i) Draw the flowchart. (ii) Write the pseudocode. (iii) Find the amount to pay for Rs. 6500 and Rs. 3000. (6 marks) *(6 marks)*

(i) Start, input Total, Discount = 0, diamond Total > 5000?, Yes → Discount = Total × 10 / 100, display, Stop (2). (ii) As shown (2). (iii) Rs. 5850 and Rs. 3000 (2).

Pseudocode

```
BEGIN
  INPUT Total
  Discount = 0
  IF Total > 5000 THEN
    Discount = Total * 10 / 100
  ENDIF
  DISPLAY Discount, Total - Discount
END
```



Flowchart – If–EndIf: 10% discount on a bill over Rs. 5000

2. Write a program (Pascal or Python) to input a number and display whether it is even or odd. (4 marks) *(4 marks)*

Input (1); condition N mod 2 = 0 (1); display even (1); else display odd (1).

If–Else–EndIf: even or odd

Pascal

```
program EvenOdd;
var
  n: integer;
begin
  write('Enter a number: ');
  readln(n);
  if n mod 2 = 0 then
    writeln(n, ' is even')
  else
    writeln(n, ' is odd');
end.
```

Python

```
n = int(input("Enter a number: "))
if n % 2 == 0:
    print(n, "is even")
else:
    print(n, "is odd")
```

Sample run 1

```
Enter a number: 14
14 is even
```

Sample run 2

```
Enter a number: 7
7 is odd
```

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3. Write pseudocode that inputs marks and displays the O/L grade (A ≥ 75, B ≥ 65, C ≥ 50, S ≥ 35, W otherwise). (5 marks) *(5 marks)*

> Input (1); IF ≥ 75 A (1); ELSE IF ≥ 65 B, ≥ 50 C (1); ≥ 35 S (1); ELSE W and display (1).
> **Pseudocode**

```
BEGIN
  INPUT Marks
  IF Marks >= 75 THEN
    Grade = "A"
  ELSE IF Marks >= 65 THEN
    Grade = "B"
  ELSE IF Marks >= 50 THEN
    Grade = "C"
  ELSE IF Marks >= 35 THEN
    Grade = "S"
  ELSE
    Grade = "W"
  ENDIF
  DISPLAY Grade
END
```

4. (i) When is a Case statement used? (1 mark)
(ii) Write a Case statement in pseudocode that displays “Sunday” for 1, “Monday” for 2 and “Invalid day” otherwise. (3 marks) *(4 marks)*

> (i) When one variable is compared with many fixed values. (ii) CASE Day OF 1 : DISPLAY “Sunday”; 2 : DISPLAY “Monday”; OTHERWISE : DISPLAY “Invalid day”; ENDCASE.

5. Find the error in this Pascal code and correct it: if Mark >= 35 then writeln('Pass'); else writeln('Fail'); (2 marks) *(2 marks)*

> There must be no semicolon before else (1). Correct: if Mark >= 35 then writeln('Pass') else writeln('Fail'); (1).

Summary

- Selection = making a decision.
- If–EndIf: do it or skip it.
- If–Else–EndIf: one of two paths.
- ELSE IF chains check conditions in order.
- Case: one of many fixed values.
- Pascal: case … of; Python: match … case.
- Pascal: no ; before else. Python: indent.
- Test every path with test data.

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MCQ answer key – 1.6

1. **D** – Skipped.
2. **B** – One of two.
3. **C** – 6500 − 650.
4. **A** – Not over 5000.
5. **B** – Remainder 1.
6. **C** – ≥ 75.
7. **A** – < 35.
8. **B** – 65–74.
9. **A** – Many fixed values.
10. **C** – Python 3.10+.
11. **D** – Semicolon ends the if.
12. **C** – Indentation.
13. **B** – Yes → THEN.
14. **D** – Pascal: else.
15. **A** – Test both paths.

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