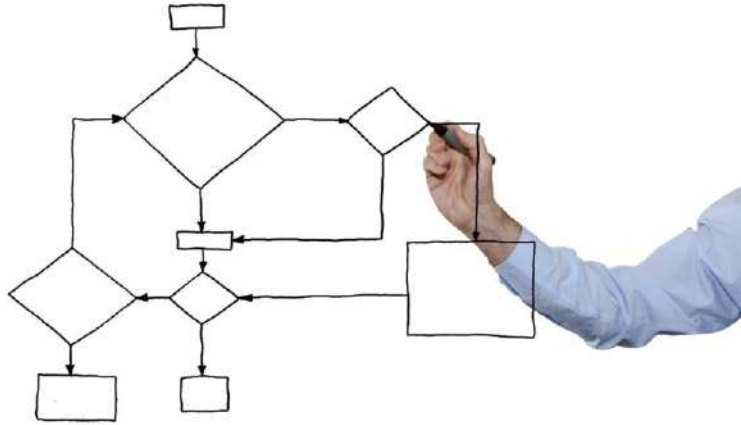
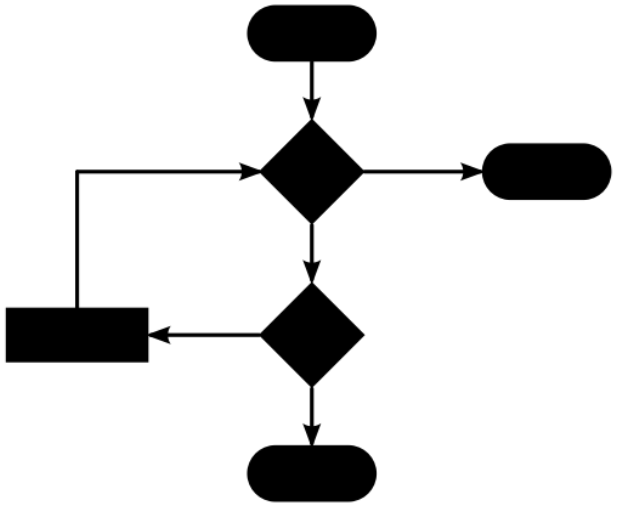


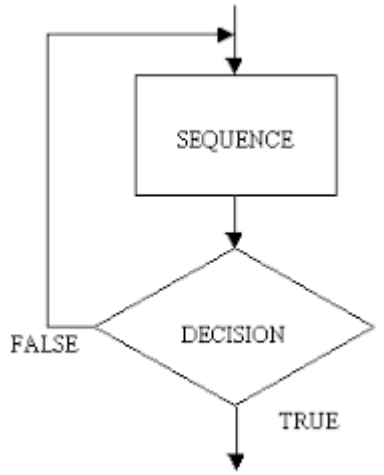


Problem Solving (using flowcharts)

Programming II

By Dr. Mohammed A. Bamatraf

Lab. Instructors : Eng. Shaymaa + Eng. Kholood

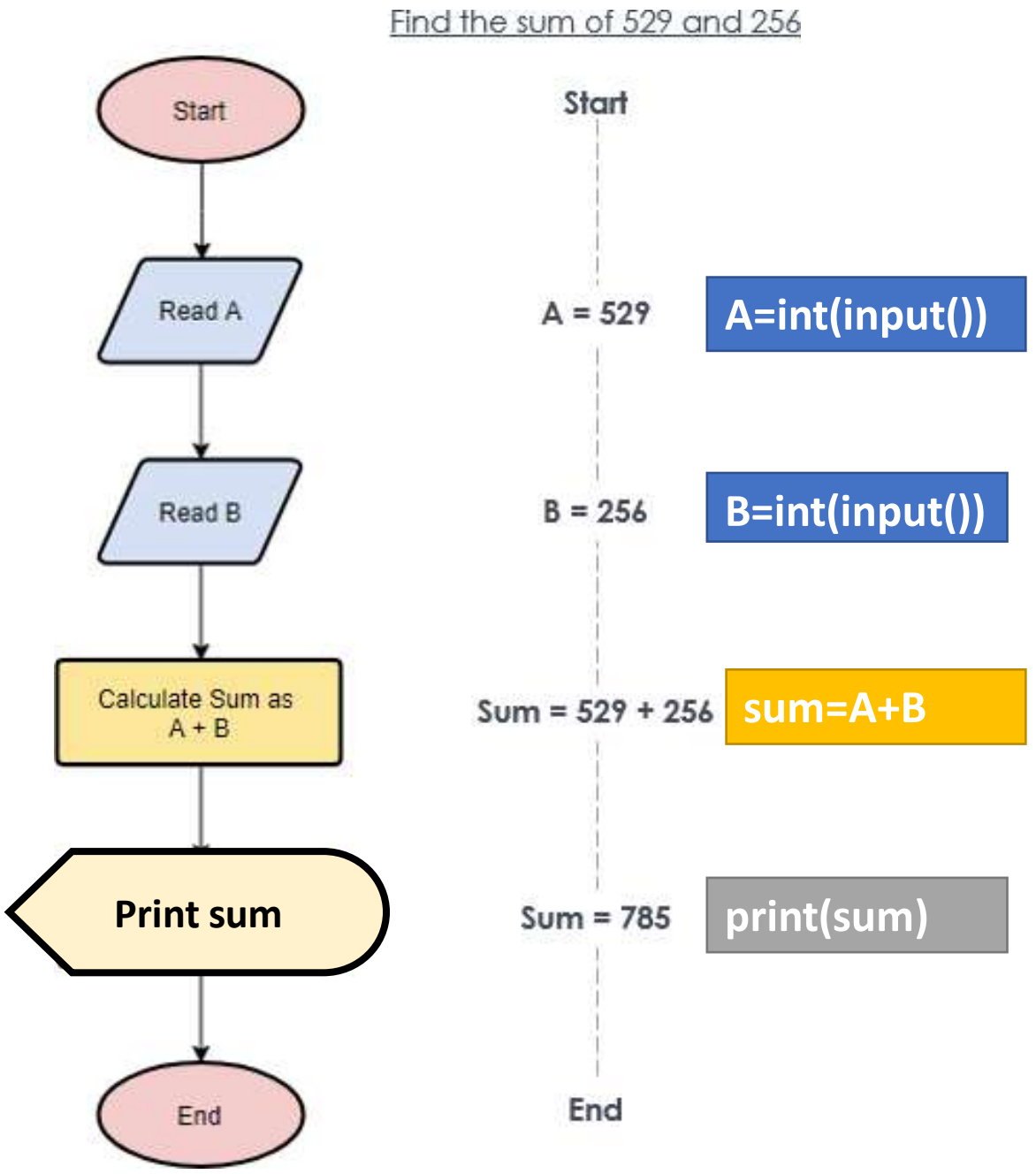


HADHRAMOUT UNIVERSITY

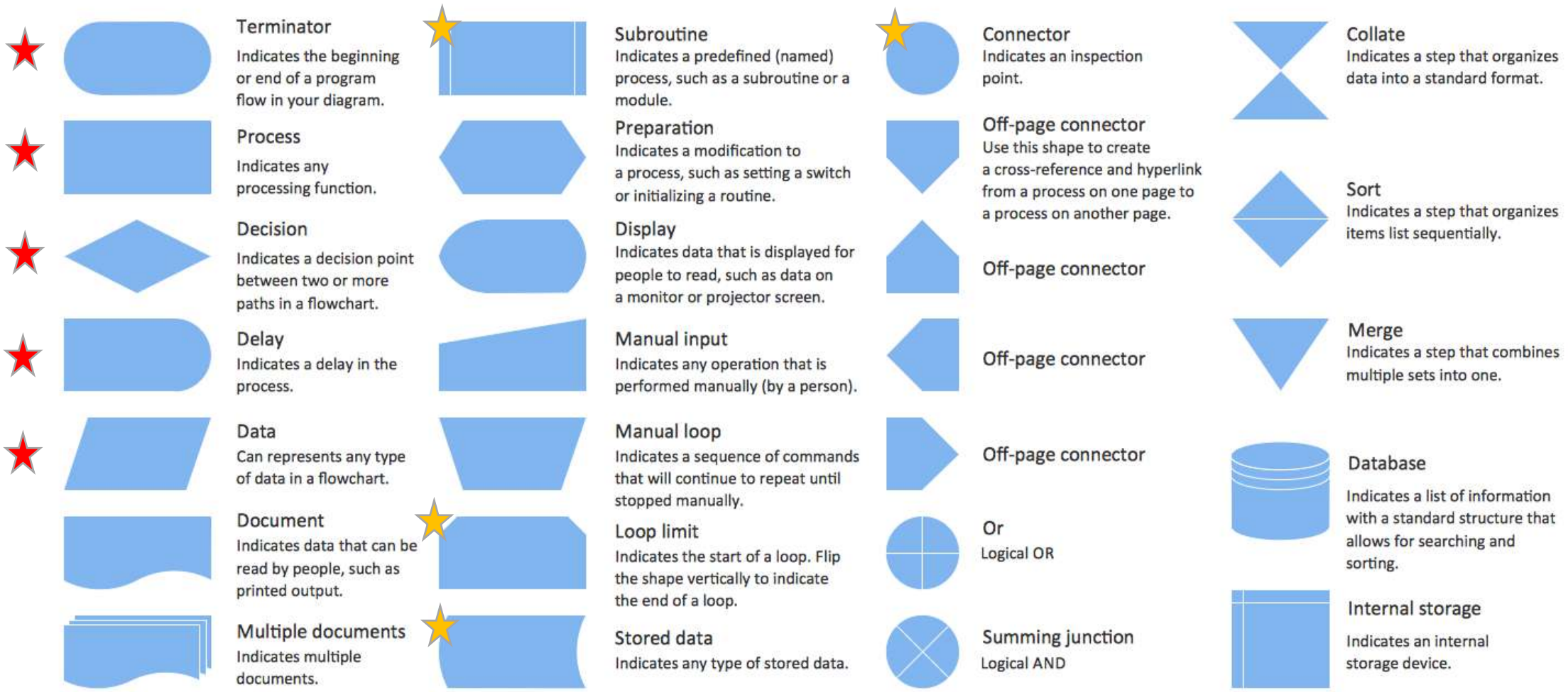
كلية الحاسبات وتقنية المعلومات
College of Computers & Information Technology

What is a flowchart?

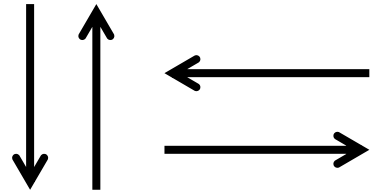
- Graphical or visual representation/description of a problem solution or a business process, using set of standard symbols.
- A flowchart illustrates a process, system or computer algorithm or a program .
- They are widely used to communicate ideas and complex processes in clear, easy-to-understand diagrams.



Flowchart standard symbols



Let us start with :



Flow direction

Start and Stop

Data (Input and output)

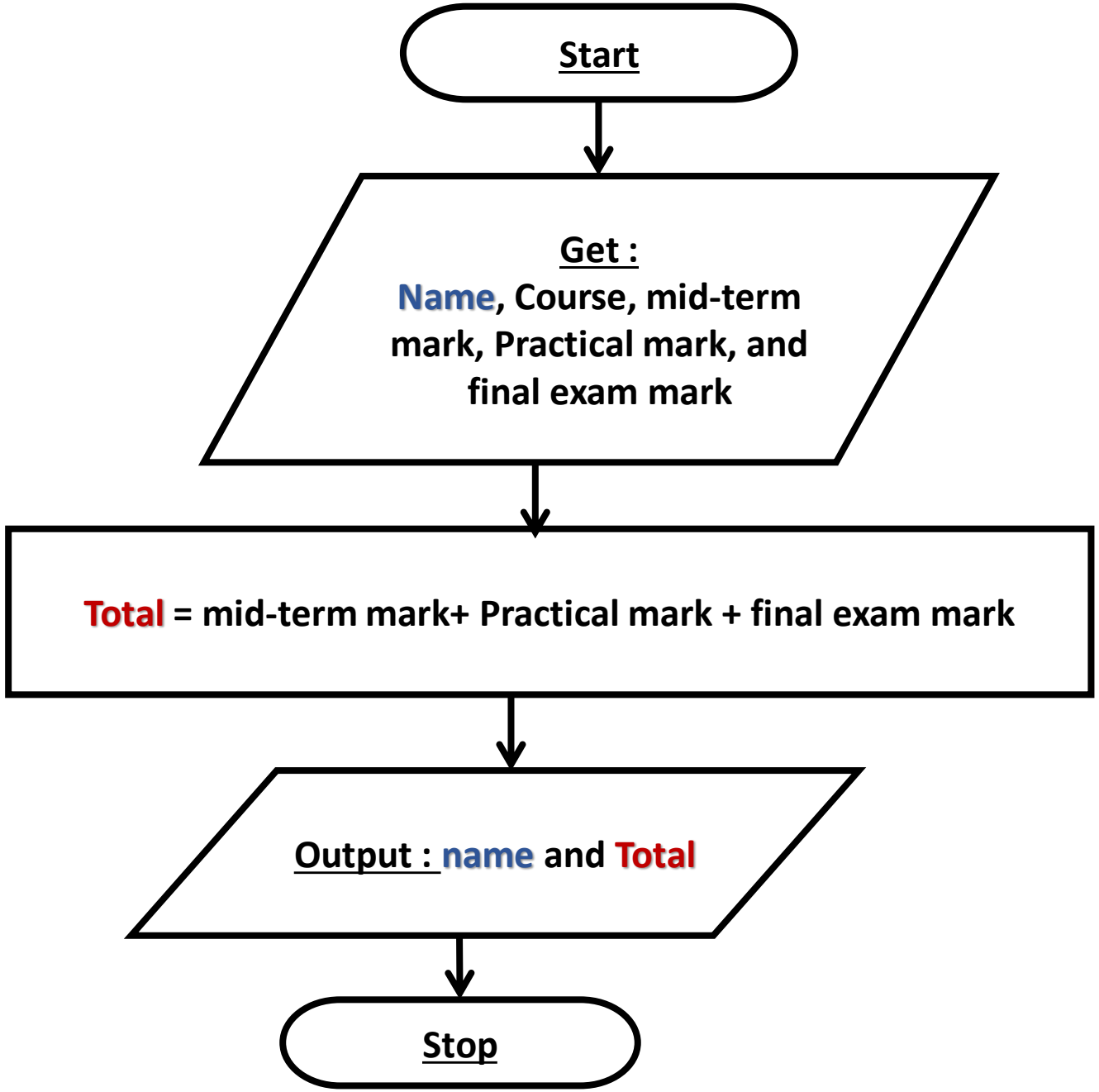
Process/Calculate

Display/output

Decission

Example 1

- Read Student name, course, and marks then print the Total marks.
- Note that total marks are calculated by adding mid-term exam, practical marks and the final exam marks

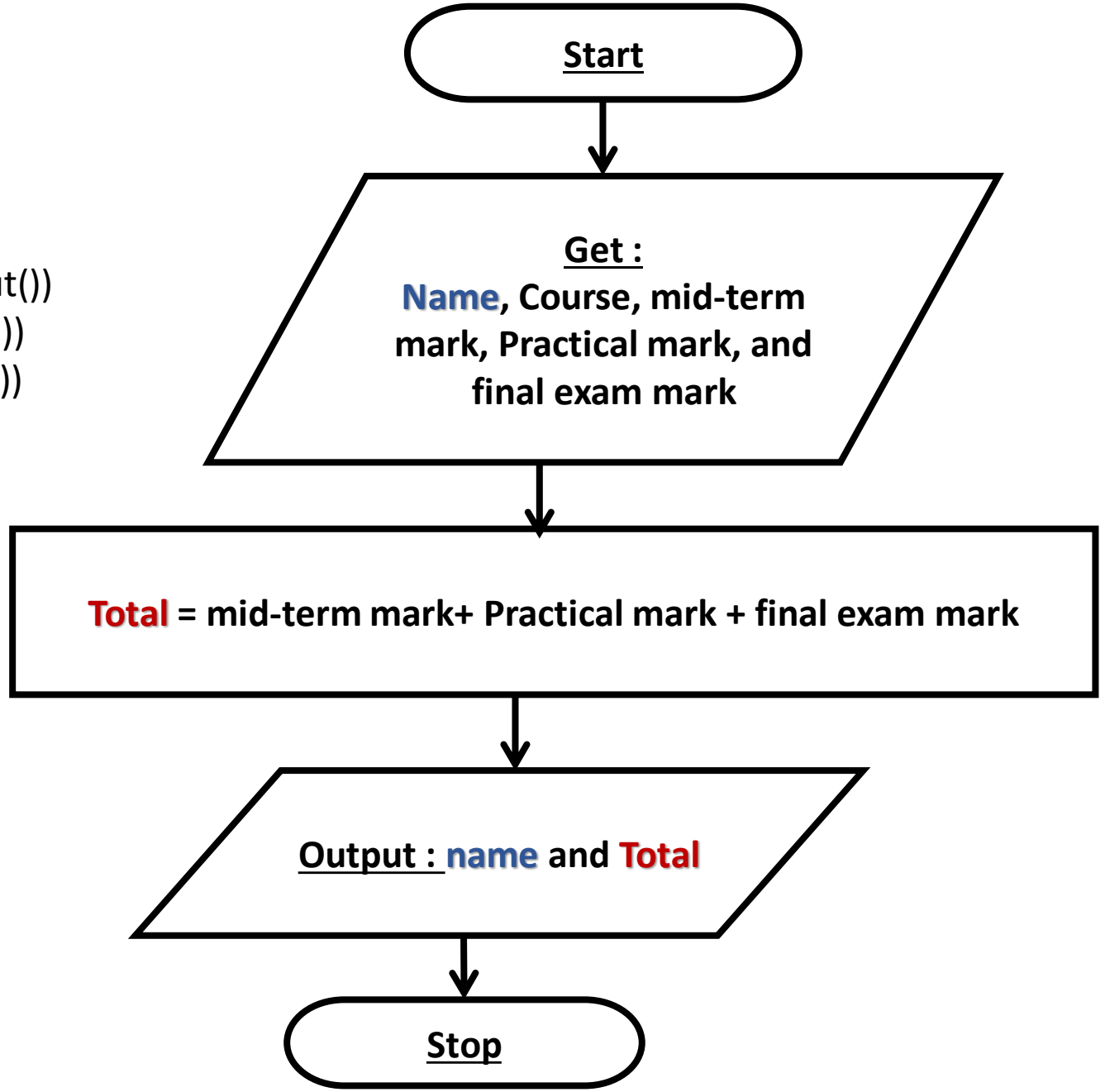


Example 1

```
name=input()
Course=input()
mtMark=int(input())
Pmark=int(input())
Fmark=int(input())
```

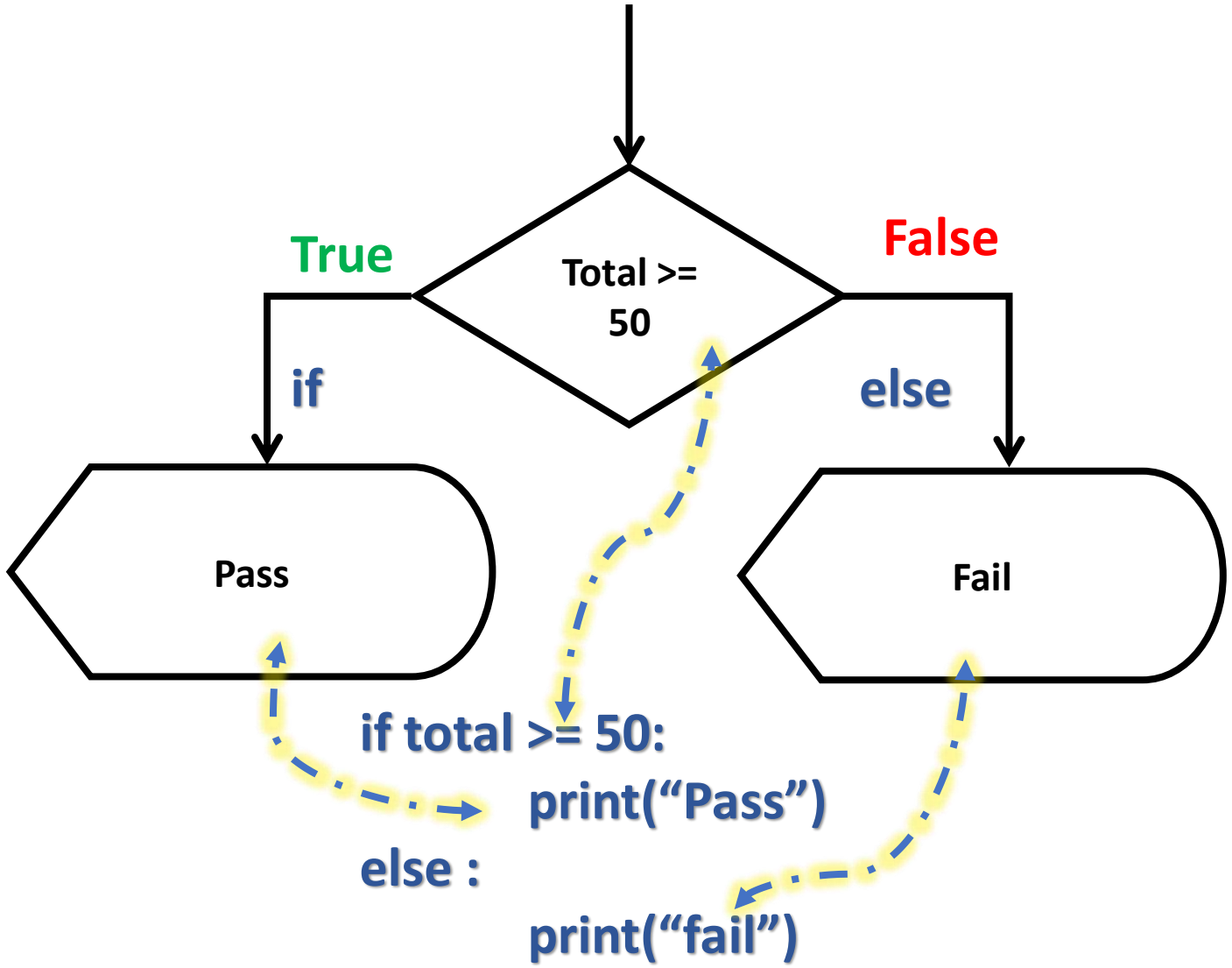
```
Total=mtMark+Pmark+Fmark
```

```
Print(name, " " ,Total)
```



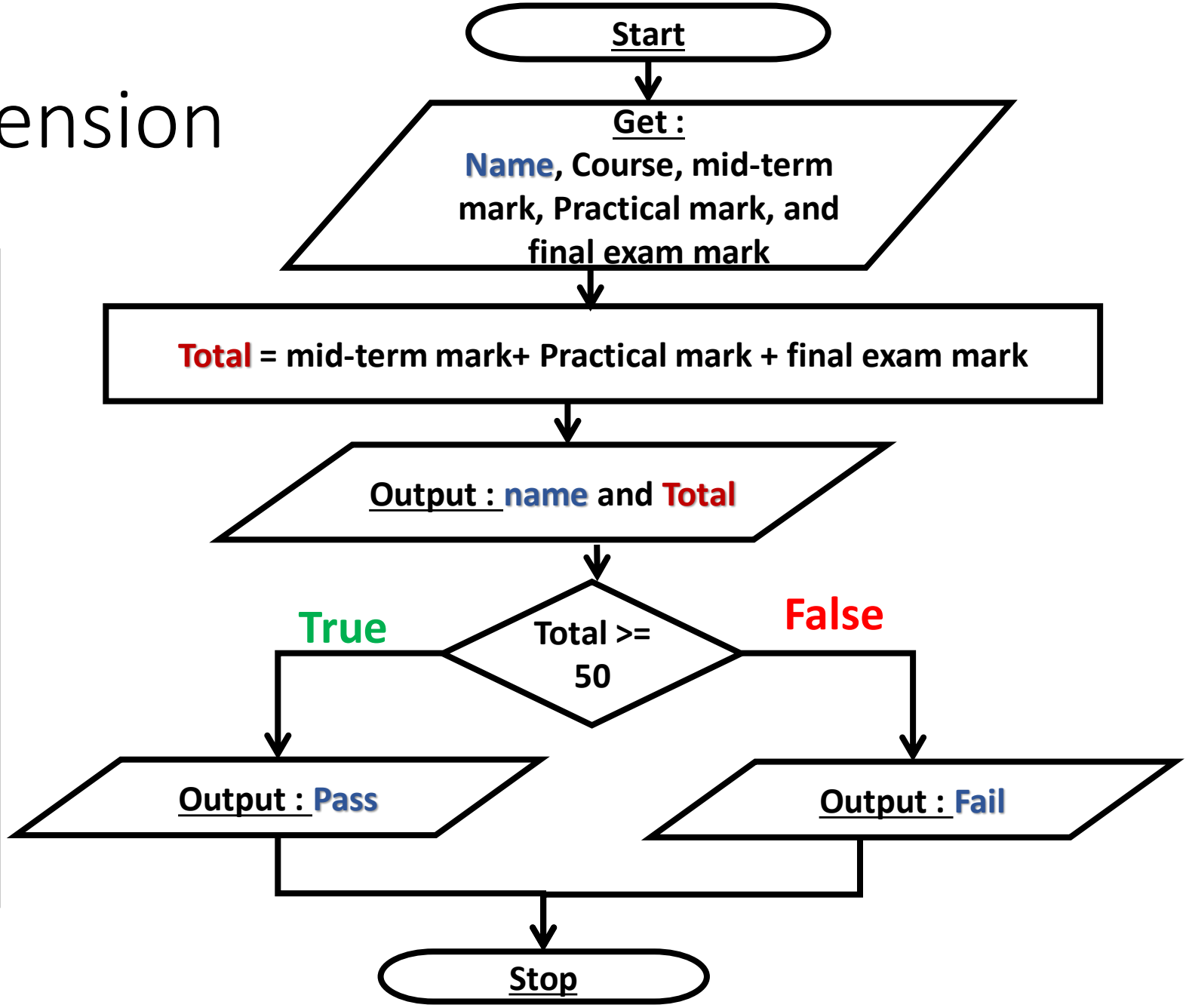
Branching/Decision

- Read Student name, course, and marks then print the Total marks.
- Note that total marks are calculated by adding mid-term exam, practical marks and the final exam marks
- Finally, print if student is passed or failed
- Student pass if the total marks score is 50 or more



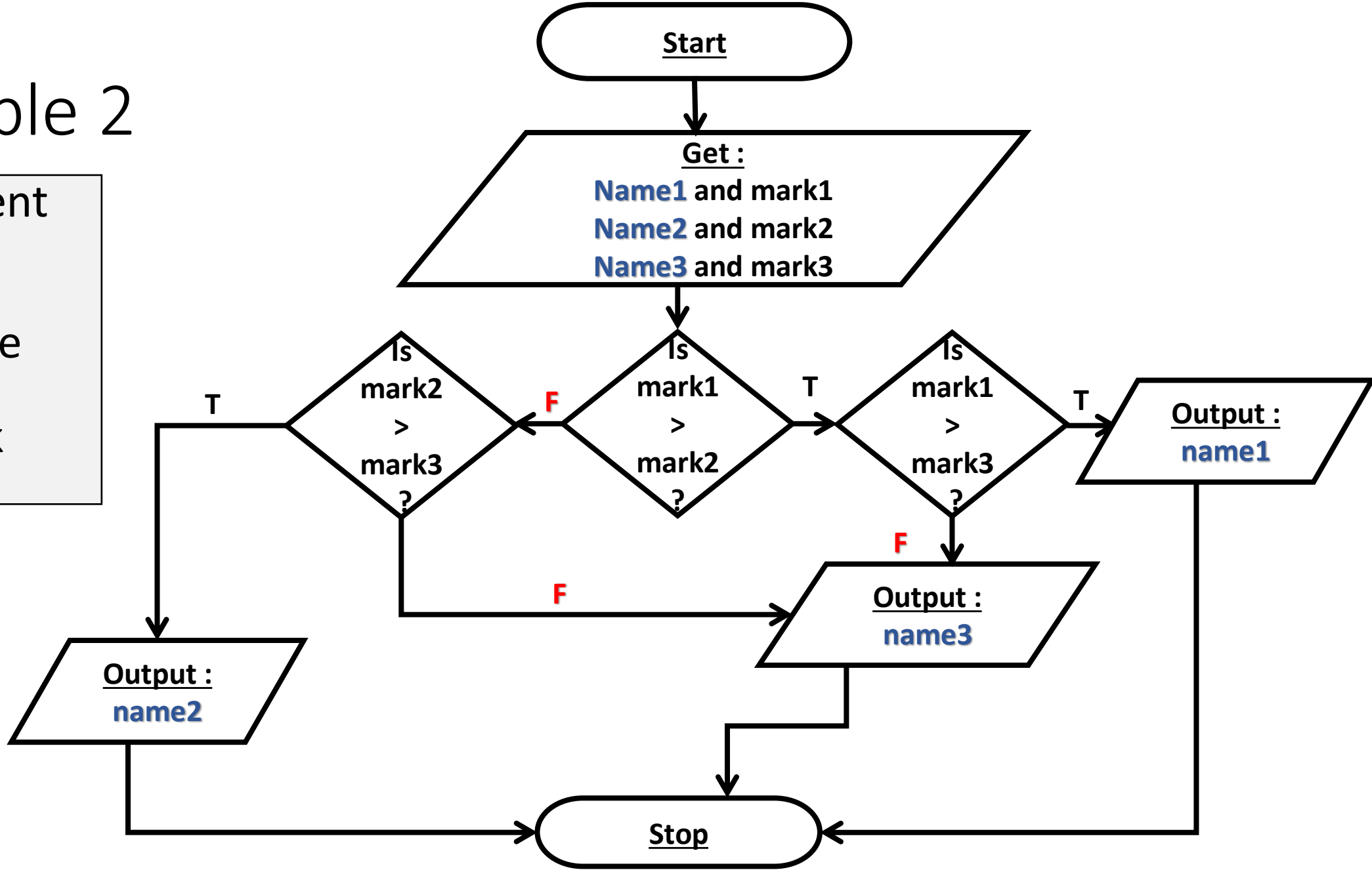
Example 1 - extension

- Read Student name, course, and marks then print the Total marks.
- Note that total marks are calculated by adding mid-term exam, practical marks and the final exam marks
- Finally, print if student is passed or failed
- Student pass if the total marks score is 50 or more



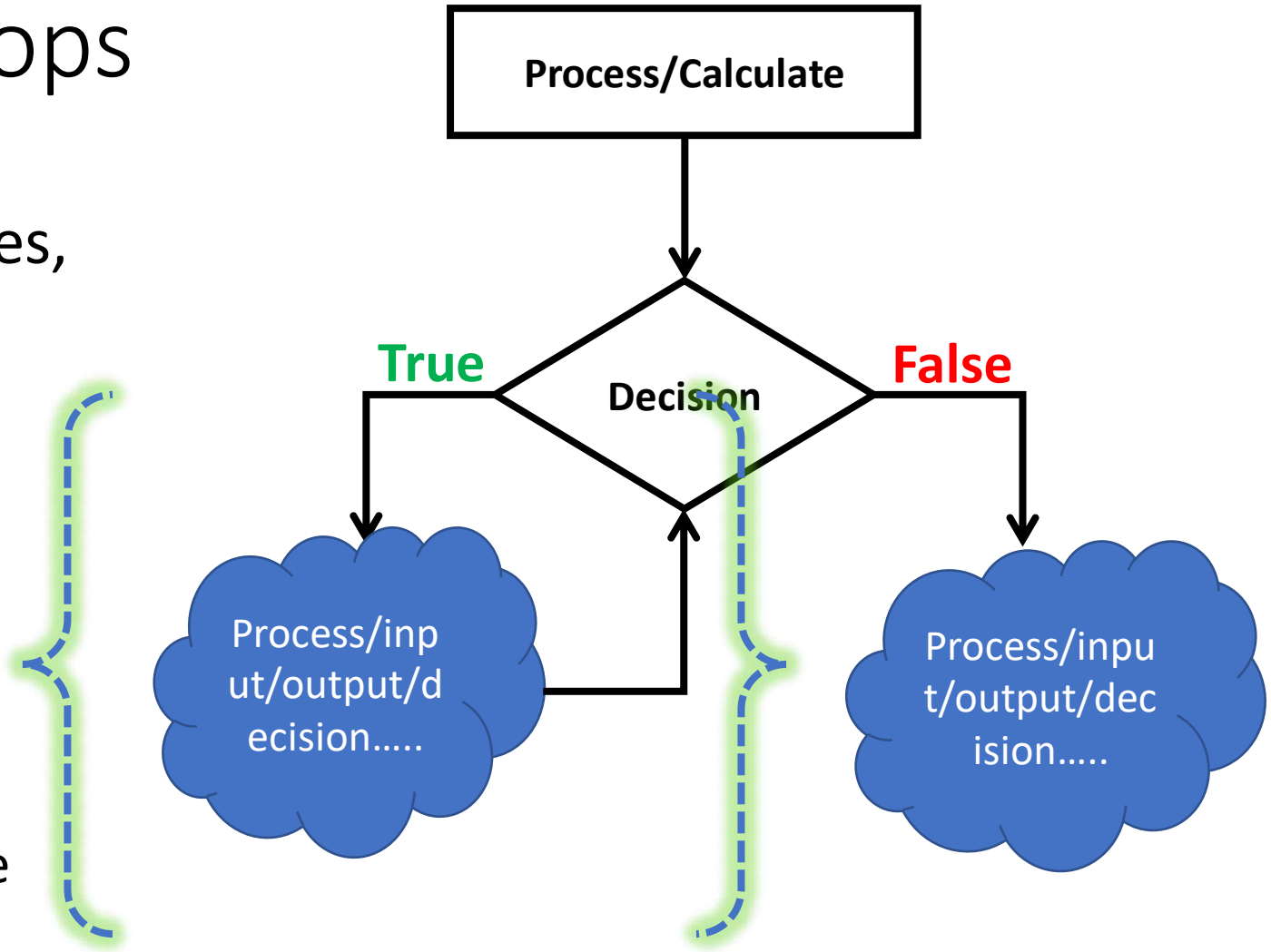
Example 2

Read 3 Student names and Total_marks, then print the student with highest mark



Iteration using Loops

- Doing an action many times, generally, based on a condition.
- You should identify the following:
  - Starting status
  - Stopping condition
  - What to do
  - State changing to meet the condition



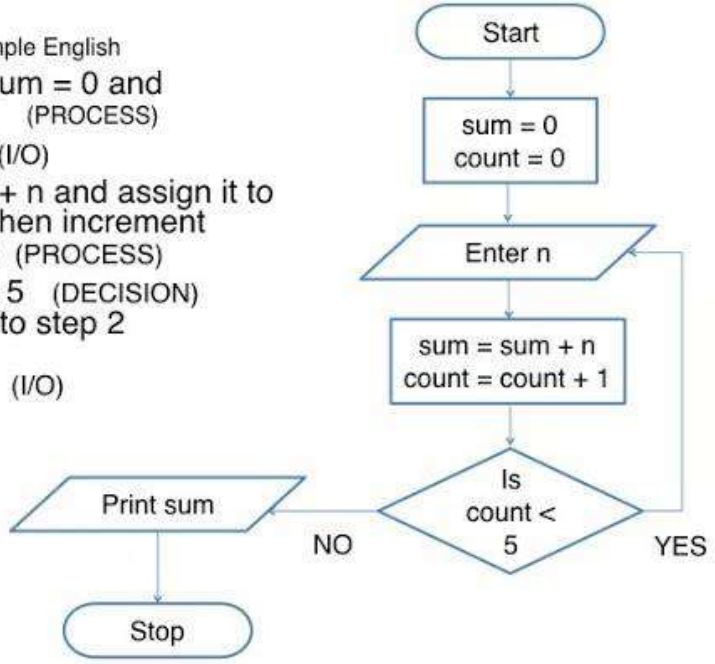
Identify Loops

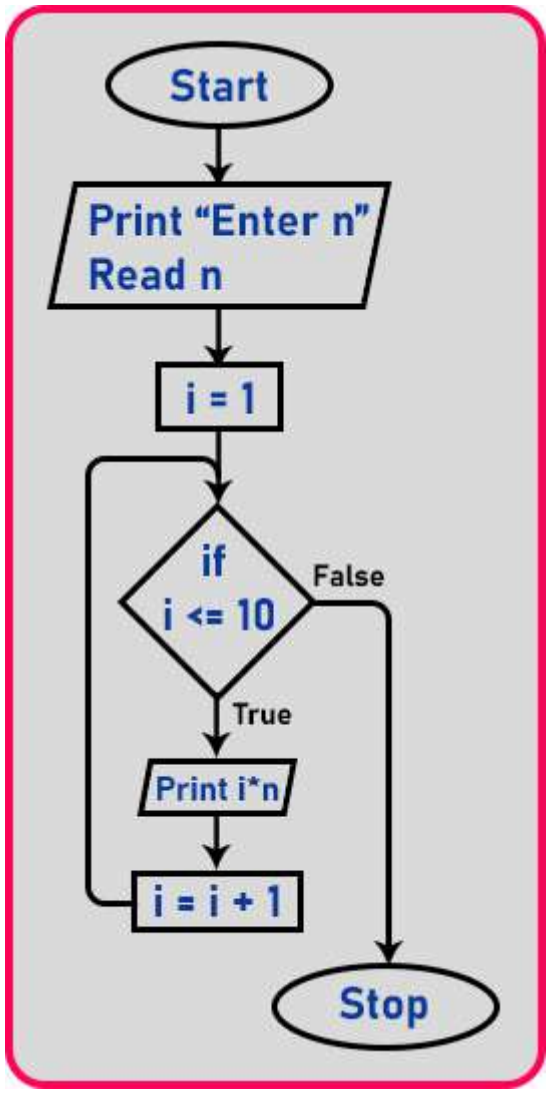
Find the sum of 5 numbers

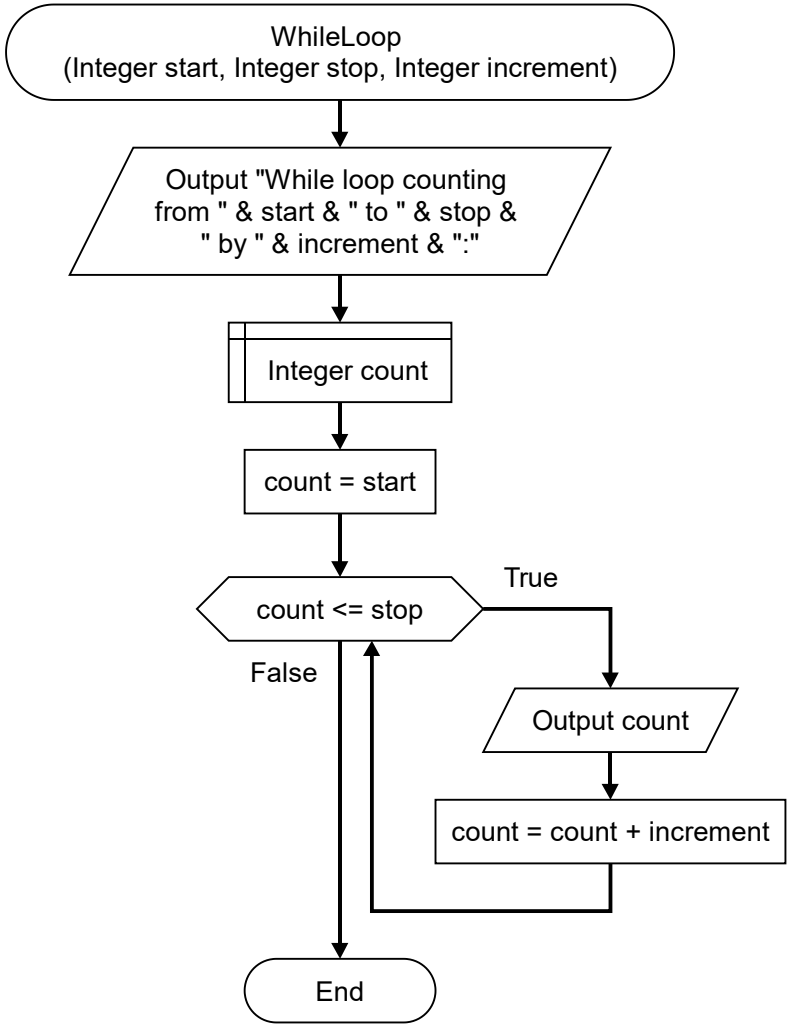
Algorithm in simple English

1. Initialize sum = 0 and count = 0 (PROCESS)
2. Enter n (I/O)
3. Find sum + n and assign it to sum and then increment count by 1 (PROCESS)
4. Is count < 5 (DECISION)
   if YES go to step 2
   else
   Print sum (I/O)

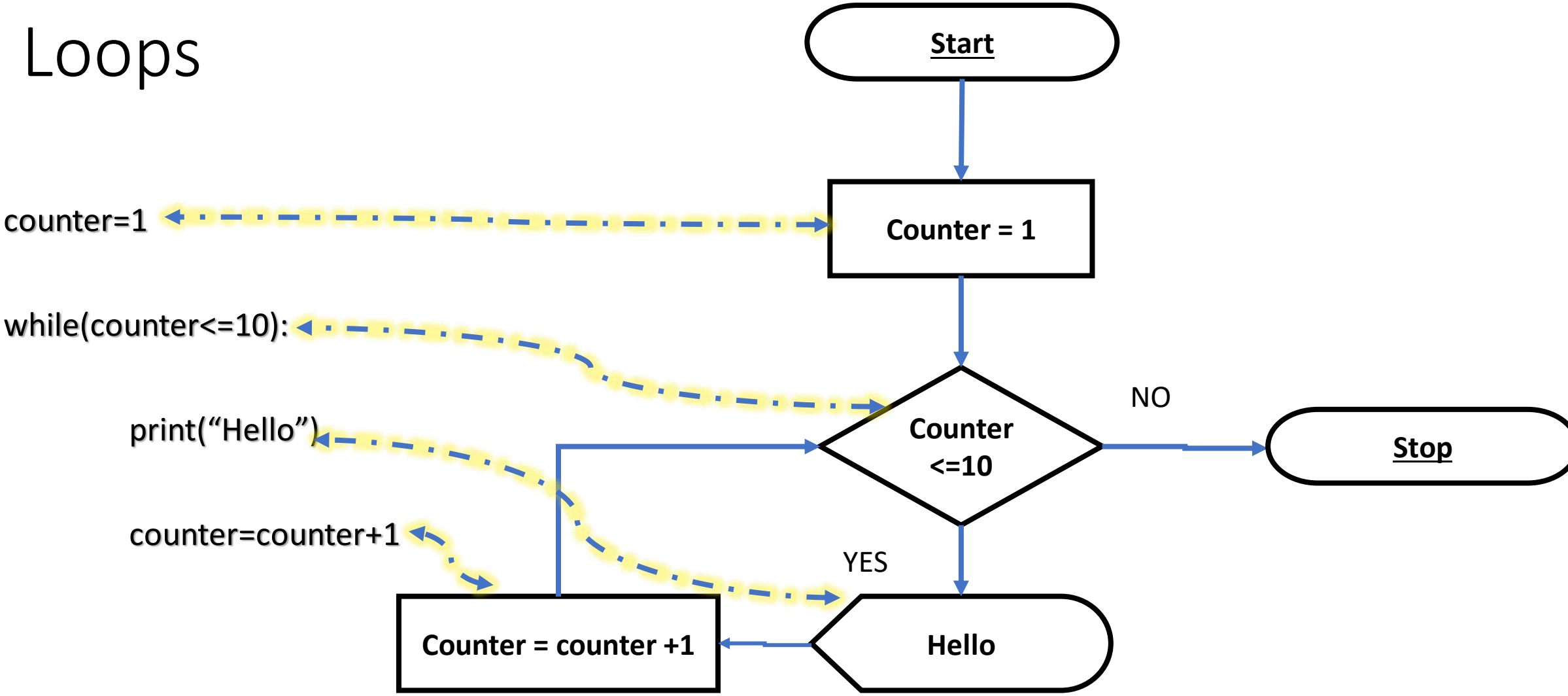
Flowchart



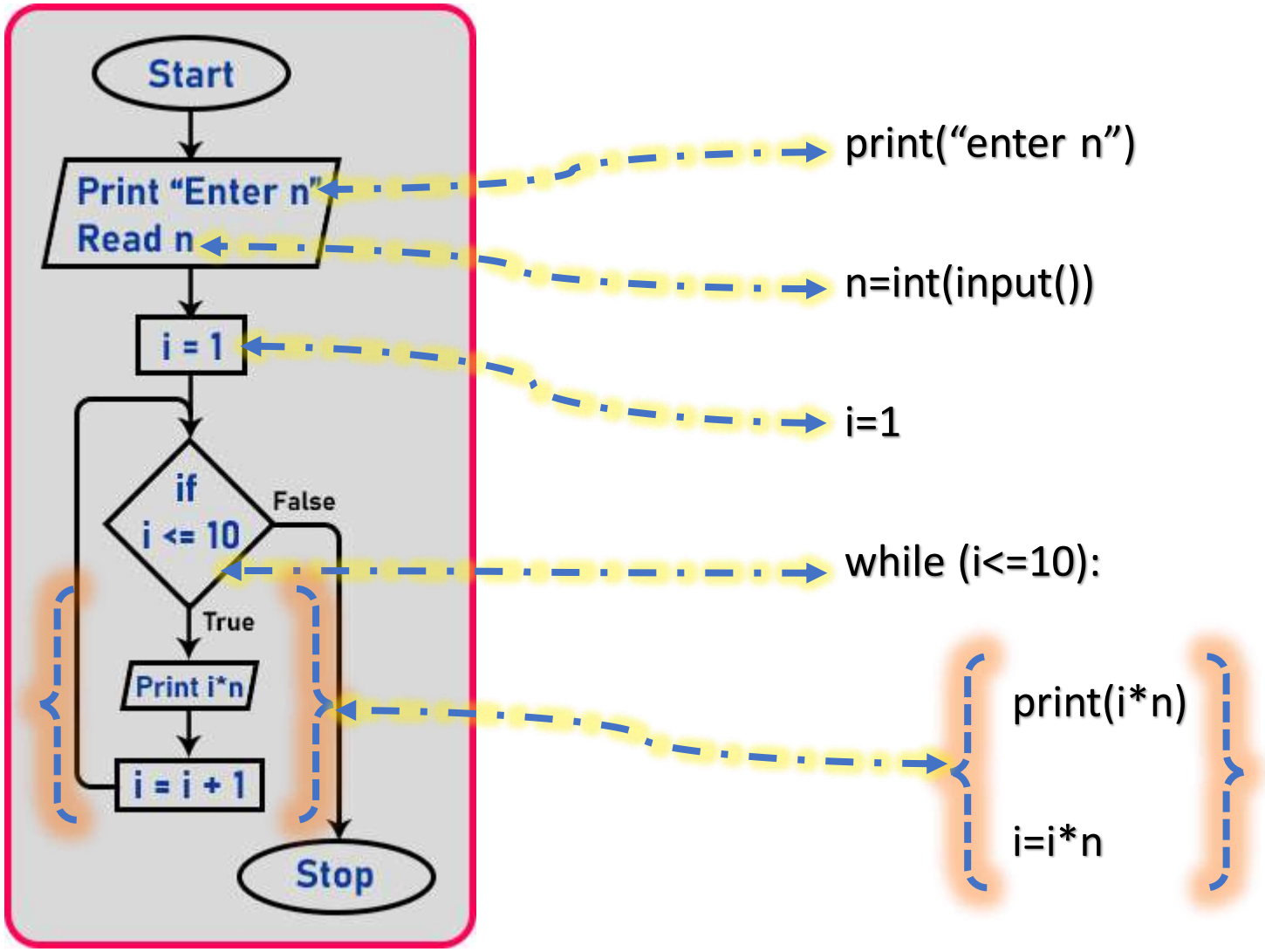




Loops

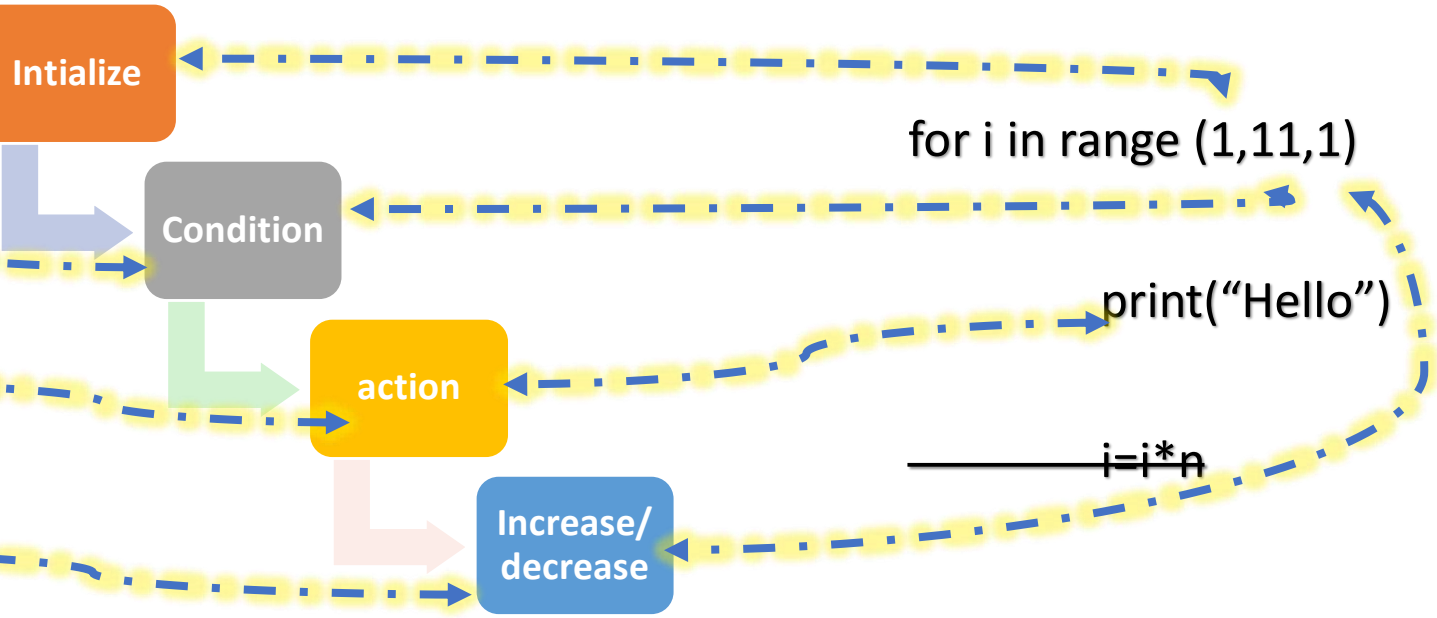

Start
counter=1
Counter = 1
while(counter<=10):
print("Hello")
Counter <=10
NO
Stop
counter=counter+1
YES
Counter = counter +1
Hello

Identify Loops



Conversion between Loops

```
print("enter n")

n=int(input())

i=1

while (i<=10):

    print("Hello")

    i=i+1
```




```
print("enter n")

n=int(input())

i=1

for i in range (1,11,1)

    print("Hello")

    i=i*n
```

Example 3

In-patient system records number of patients and their financial data, then computes the charges as following:

Room type	charges/day
A	50000
B	30000
C	10000

Discount is given as following:

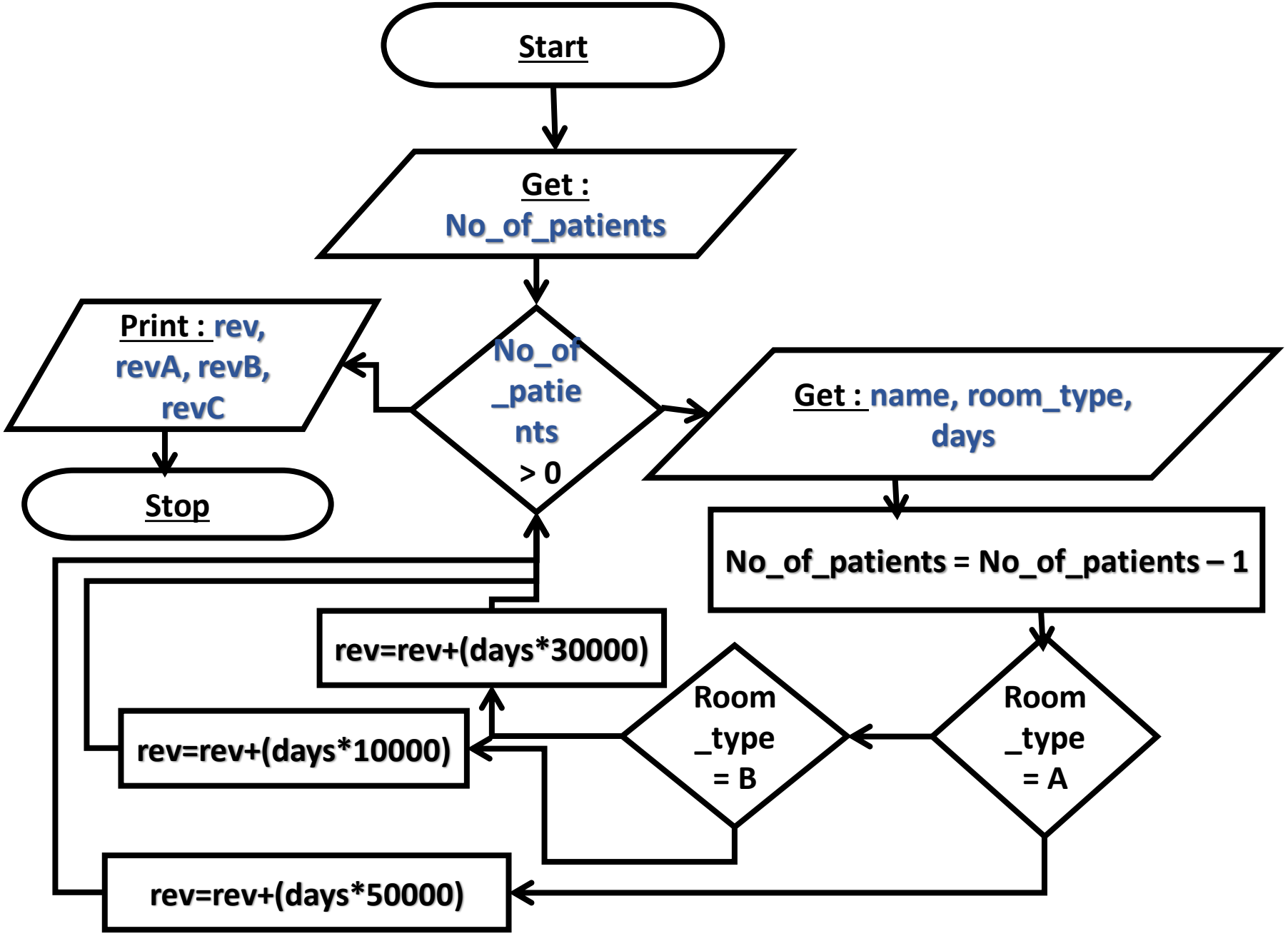
#Days	Discount
5-10 days	5%
Above 10 days	10%

If U R asked to give the following monthly reports for dis-charged patients:

Total revenue amount

Total revenue amount per room type

Total discount amount



Assignments

Student academic record module stores number of students and their results in 1 subject, then computes marks as following:

Subj. type	practical	mid-term	Final
2 cr. Hrs.	0	30	70
3 cr. Hrs	50	30	70

Grades are assigned as following:

Subj. type	mark range	Grade
2 cr. Hrs.	0-39	Fail
	40-59	pass
	60-79	Good
	80-89	very Good
	90-100	Excellent
3 cr. Hrs.	0-39	Fail
	40-59	pass
	60-79	Good
	80-89	very Good
	90-100	Excellent

1

If U R asked to give the following semester reports for the subject :

Total number of students at evey grade

The percentage of students per grade

A bank transactional module, calculates the customer account balance based on last 5 transactions.

Operation could either be :

Deposit + balance

or Widthrawal – balance

The report prints the list of transactions and the customer account balance as following:

2

Acoount number: 00000000

Account Holder : XXXXXXXXXXXXXXX

Seq .	Date	amount	operation
1	11/11/2022	50000	Deposit
2	…….		
3	…….		
4	…….		
5	…….		

_____

Balance : 0000000

Assignments

Supermarket invoice

Date :

Customer: XXXXXXXXXXXXXXX

Seq .	item	qty	Unit price	amount
1	Sugar	2	12000	24000
2	……			
3	……			
4	……			
5	……			

3

Total : 000000

Discount: 0000000

Net total : 000000

Nested Loops

- Print 1-5
- print 1-5 ten times
- Read 10 students names
- For every student read 15 marks

Assignments

Generate the daily report for exchange company for all branches as following:

Every branch has casheirs.

Every cashier performs either of the following transcactions

1. **Deposit operations**
2. **Withdrawal operations**
3. **Exchange operations**

4

The report must contain the the totals of each operation

and the totals for each operation per branch

A super market daily cashier closing report includes

Cashier Name, ID along with the total income per cashier.

5

Assignments Using Loops (Optional)

- Matrix summaries
- Multiplication table
- Multiply, divide numbers without using * or /
- Generate shapes (10 excercises)
- Generate spiral matrix
- Convert decimal to binary and vice versa
- Reverse +ve integer and print the sum of digits
- Previous assignments