



Unit II – Part 02

(Solved Problems)





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Objectives

By the end of this session, students will be able to:

- Understand algorithm, flowchart and pseudocode
- Write algorithms
- Draw flowcharts
- Write pseudocodes
- Translate algorithms into flowchart and pseudocode



Example 1

Problem: Write an algorithm to compute the sum of two numbers. Translate your algorithm into flowchart and pseudocode.

Prior to writing algorithms, we need to identify the inputs and outputs for the given problem.

***Input:** Lets consider A & B (**either run time or compilation initialization can be adopted**)*

***Output:** the sum of A & B*



Example 1 (cont..)

Algorithm:

Step 0: START

Step 1: Read the values of A & B (compile time initialization)

Step 2: Compute the sum of A+B

Step 3: Display the sum

Step 4: STOP

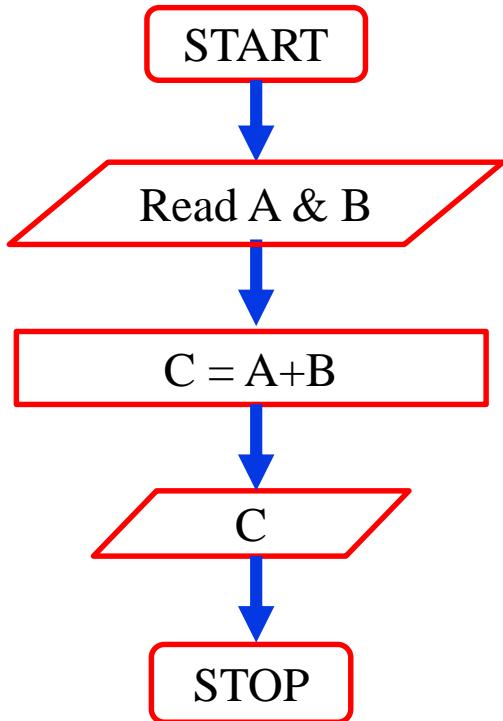


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Example 1 (cont..)

Flowchart:



Algorithm:

Step 0: START
Step 1: Read the values of A & B (compile time initialization)
Step 2: Compute the sum of A+B
Step 3: Display the sum
Step 4: STOP



Example 1 (cont..)

Pseudocode:

```
READ A, B  
COMPUTE C = A+B  
DISPLAY C
```

Algorithm:

Step 0: START
Step 1: Read the values of A & B
(compile time initialization)
Step 2: Compute the sum of A+B
Step 3: Display the sum
Step 4: STOP

Keywords:

Input: READ, OBTAIN, GET &
PROMPT
Output: PRINT, DISPLAY, and SHOW
Compute: COMPUTE, CALCULATE,
DETERMINE
Initialize: SET, INITIALIZE
Add one: INCREMENT



Example 2

Problem: Write an algorithm to check whether a number is even or odd. Draw flowchart and write pseudocode for your algorithm.

Prior to writing algorithms, we need to identify the inputs and outputs for the given problem.

***Input:** Lets consider A (**either run time or compilation initialization can be adopted**)*

***Output:** It should print either even or odd*



Example 2 (cont..)

Algorithm:

Step 0: START

Step 1: Get the number from the user (runtime initialization)

Step 2: Compute Remainder ($R = A \% 2$)

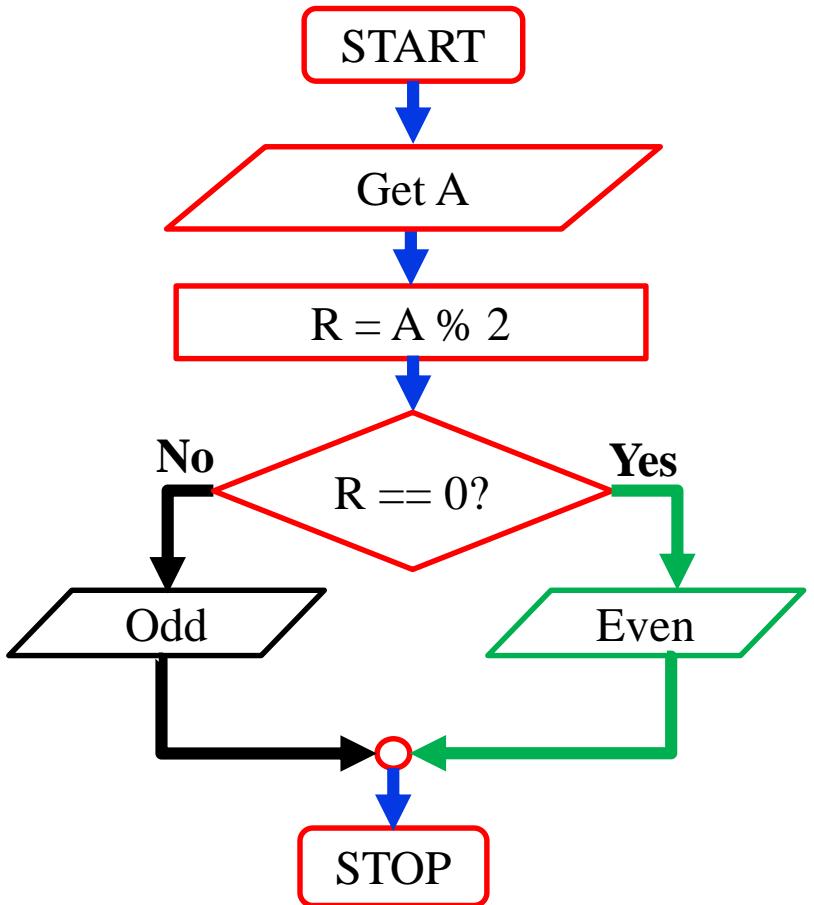
Step 3: If R is equal 0, then print “the number is even
otherwise print “ the number is odd”

Step 4: STOP



Example 2 (cont..)

Flowchart:



Algorithm:

Step 0: START
Step 1: Get the number from the user (runtime initialization)
Step 2: Compute Remainder ($R = A \% 2$)
Step 3: If R is equal 0, then print “the number is even” otherwise print “ the number is odd”
Step 4: STOP



Example 2 (cont..)

Pseudocode:

```
PROMPT user enter A  
CALCULATE R = A %2  
IF (R==0) :  
    THEN DISPLAY "even"  
    ELSE DISPLAY "Odd"  
ENDIF
```

Algorithm:

Step 0: START

Step 1: Get the number from the user
(runtime initialization)

Step 2: Compute Remainder ($R=A\%2$)

Step 3: If R is equal 0, then print “the
number is even

otherwise print “ the number is
odd”

Step 4: STOP



Example 3

Problem: Write an algorithm to print first N whole numbers. Draw flowchart and write pseudocode for your algorithm.

Prior to writing algorithms, we need to identify the inputs and outputs for the given problem.

Input: Lets consider N (***either run time or compilation initialization can be adopted***)

Output: print all first N whole numbers ($0, 1, 2, \dots, N-1$)



Example 3 (cont..)

Algorithm:

Step 0: START

Step 1: Enter the value of N

Step 2: set the initial value of i to 0

Step 3: Print i

Step 4: Increase the value of i by 1

Step 5: if i is less than N , then repeat from **step 3 and 4**
otherwise go the **next step**

Step 6: STOP

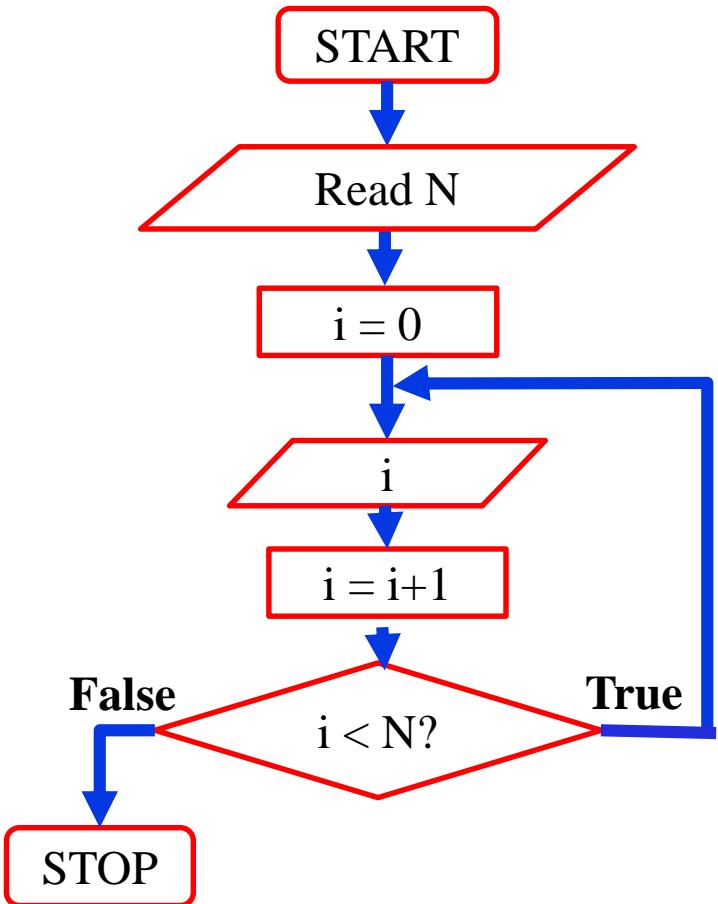


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Example 3 (cont..)

Flowchart:



Algorithm:

Step 0: START
Step 1: Enter the value of N
Step 2: set the initial value of i to 0
Step 3: Print i
Step 4: Increase the value of i by 1
Step 5: if i is less than N, then repeat from step 3
otherwise go the next step
Step 6: STOP



Example 3 (cont..)

Pseudocode:

```
GET N  
SET i = 0  
DO :  
    SHOW i  
    INCREMENT i by 1  
    WHILE (i < N)  
ENDDOWHILE
```

Algorithm:

- Step 0: START
- Step 1: Enter the value of N
- Step 2: set the initial value of i to 0
- Step 3: Print i
- Step 4: Increase the value of i by 1
- Step 5: if i is less than N, then repeat from step 3
 - otherwise go the next step
- Step 6: STOP

Keywords:

- Input:** READ, OBTAIN, GET & PROMPT
- Output:** PRINT, DISPLAY, and SHOW
- Compute:** COMPUTE, CALCULATE, DETERMINE
- Initialize:** SET, INITIALIZE
- Add one:** INCREMENT



Example 4

Problem: Write an algorithm to print the multiplication table of 2 from 0 to 15. Draw flowchart and write pseudocode for your algorithm.

Prior to writing algorithms, we need to identify the inputs and outputs for the given problem.

Input: the two operands (ie 2 and $i = 0$ to 15)

Output: print multiplication table



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Example 4 (cont..)

Manual Multiplication:

2	x	0	= 0
2	x	1	= 2
2	x	2	= 4
2	x	3	= 6
2	x	4	= 8
2	x	5	= 10
2	x	6	= 12

$$2 \times i = p$$





Example 4 (cont..)

Algorithm:

Step 0: START

Step 1: set the initial value of i to 0

Step 2: when i is less than or equal to 15:

 2.1 compute $p = 2 \times i$

 2.2 print “ $2 \times i = p$ ”

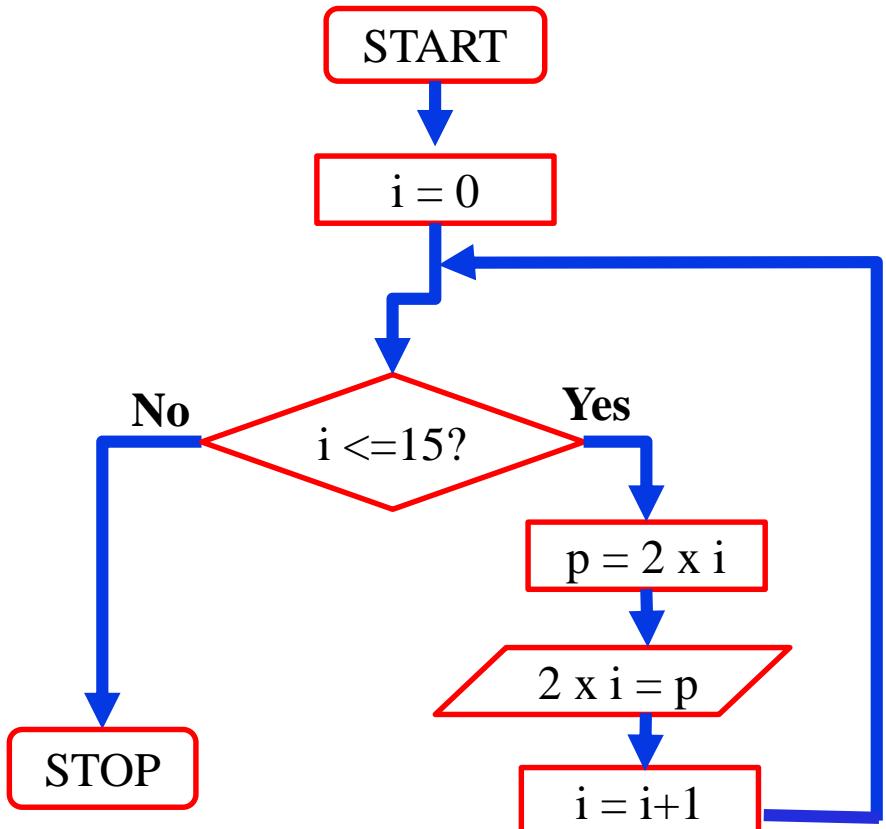
 2.3 increase the value of i by 1

Step 3: STOP



Example 4 (cont..)

Flowchart:



Algorithm:

Step 0: START
Step 1: set the initial value of i to 0
Step 2: when i is less than or equal to 15:
 2.1 compute $p = 2 \times i$
 2.2 print " $2 \times i = p$ "
 2.3 increase the value of i by 1
Step 3: STOP



Example 4 (cont..)

Pseudocode:

```
INITIALIZE i to 0
WHILE (i<=15) :
    COMPUTE p = 2 x i;
    SHOW 2 x i = p;
    INCREMENT i by 1;
ENDWHILE;
```

Algorithm:

Step 0: START

Step 1: set the initial value of i to 0

Step 2: when i is less than or equal to 15:

 2.1 compute $p = 2 \times i$

 2.2 print " $2 \times i = p$ "

 2.3 increase the value of i by 1

Step 3: STOP

Keywords:

Input: READ, OBTAIN, GET & PROMPT

Output: PRINT, DISPLAY, and SHOW

Compute: COMPUTE, CALCULATE, DETERMINE

Initialize: SET, INITIALIZE

Add one: INCREMENT



CLASS ACTIVITY

Write algorithm, pseudocode and draw flowchart for the following:

1. Circumference of a circle.
2. Determine the maximum of two numbers
3. Determine whether a character is vowel or consonant
4. Determine the minimum number among three entered numbers
5. Print all odd numbers from 1-100
6. Print the series 30 25 20 15 10 5 0



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CLASS ACTIVITY

Read any number from 1-7 and as per the number entered, display its corresponding day of the week as shown below using:

Score

1
2
3
4
5
6
7

Result

“Monday”
“Tuesday”
“Wednesday”
“Thursday”
“Friday”
“Saturday”
“Sunday”



Home Assignment

1. Write algorithms for the following
 - a) Print your name on the screen
 - b) Determine the user input year as leap year or not
 - c) Compute sum of all even numbers between 0-100
 - d) Add two 2×2 matrix
 - e) Determine the largest number among 10 user entered number



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Home Assignment

- f) Get the marks of a student and grade the student performance as follows

Average	Grade
80-100	Excellent
70-79.9	Very Good
60-69.9	Good
50-59.9	Satisfactory
0-49.9	Fail

Note: Student should be awarded from 0-100

2. Translate algorithms that you have designed in question 1 to flowchart and pseudocode.



Thank you