

PROBLEM SOLVING EXAMPLES

Write the algorithm, pseudo code and draw a diagram for the following:

Example 5.10: Find the area and circumference of a circle.

Algorithm

Step 1: Start

Step 2: Input the radius of the circle

Step 3: Find the area and circumference of the circle using the formula.

Area \leftarrow 3.14*r*r

Circumference ← 2*3.14*r

Step 4: Print the area and circumference of the circle

Step 5: Stop

Pseudo Code

Set area, circumference.

READ the radius of the circle.

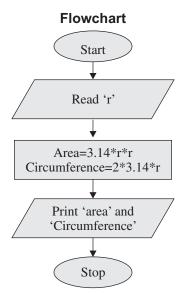
Find the area and circumference of the circle using formula.

Area=3.14*r*r

Circumference=2*3.14*r

WRITE output of area and circumference of circle.

Stop.



Example 5.2: Find the factorial of a given number.

Algorithm

Step 1: Start

Step 2: Read the value of 'n'

Step 3: Set initial values to Fact, i

Step 4: if i<=n else goto step 6

Step 4.1: Fact Fact*i

Step 4.4: i i+1

Step 5: goto step 4

Step 6: Print Fact

Step 7: Stop

Pseudo Code

Set initial one to Fact, i

READ n value to find factorial

IF (i<=n) THEN

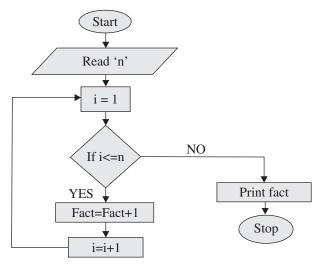
Fact = Fact * i

i = i + 1

ENDIF

WRITE the factorial of the number

Stop



Example 5.3: Write a program to find the net salary of an employee.

Algorithm

Step 1: Start

Start 2: Read the basic salary.

Step 3: IF the basic is greater than or equal to 4000 ELSE goto step 4

Step 3.1: DA 0.32 * basic; (Dearness Allowance) Step 3.2: HRA 0.15*basic; (House Rent Allowance)

Step 3.3: CCA 325; (City Compensatory Allowance)

Step 3.4: Net salary basic+DA+HRA+CCA

Step 4: Print Net salary

Step 5: Stop

Pseudo Code

Set initial zero to DA,HRA,CCA,Net salary

Read the basic

IF (basic>=4000) THEN

Calculate the allowances and net salary

DA=0.32*basic

HRA=0.15*basic

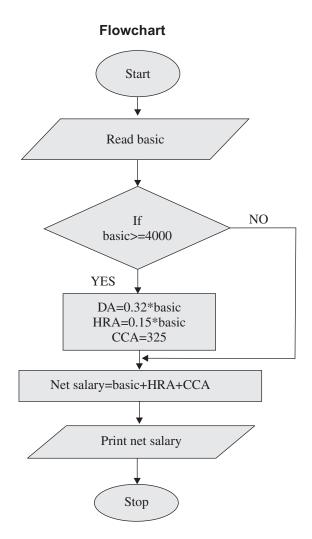
CCA=325

Net salary=basic+DA+HRA+CCA

ENDIF

WRITE the net salary

Stop



Example 5.4: Find the sum of the digits of a positive number.

Algorithm

```
Step 1: Start
Step 2: Enter the value of n
Step 3: Assign r 0, sum 0
Step 4: IF n>0 ELSE Goto step 6
Step 4.1: r n mod 10
Step 4.2: sum sum +r
Step 4.3: n n div 10
```

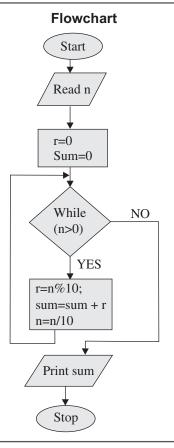
Step 5: Goto Step 4

Step 6: Print sum

Step 7: Stop

Pseudo Code

```
Set initial Zero to r,sum
Read the value of n
WHILE (N > 0)
r = n mod 10
sum = sum + r
n = n div10
ENDWHILE
Repeat while the condition fails
WRITE the sum
Stop
```



Example 5.5: Find if the given number is an Armstrong or not.

Algorithm

```
Step 1: Start
```

Step 2: Enter the value of n

Step 3: Assign a n, r=0, sum = 0

Step 4: IF n>0 ELSE Goto Step6

Step 4.1: r n mod 10

Step 4.2: sum sum + r * r * r

Step 4.3: n n div 10

Step 5: Goto Step 4

Step 6: IF a=sum THEN print Armstrong

ELSE Print Not Armstrong

Step 7: Stop

Pseudo Code

Set initial a=n,sum=0,r=0

READ the value for n

WHILE (n>0)

R=n%10

Sum=sum+r*r*r

N=n/10

ENDWHILE

Repeat while until the condition fail

IF (sum==a) THEN

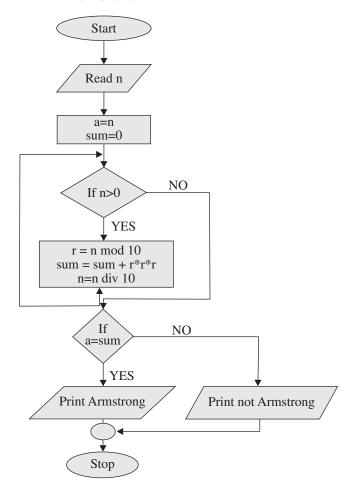
WRITE the result is Armstrong

ELSE

WRITE the result is not Armstrong

ENDIF

Stop



Example 5.6: Print the reverse of a number.

Algorithm

Step 1- start

Step 2- enter the value of n

Step 3- assign r=0,sum=0

Step 4- IF n>0

Step 4.1-r=n mod 10

Step 4.2-sum=sum*10+r

Step 4.3-n=n div 10

Step 5- goto step 4

Step 6- print sum

Step 7-stop

Pseudo Code

Set initial sum=0,r=0

READ the value of n

WHILE (n>0)

R=n%10

Sum=sum*10+r no

N=n/10

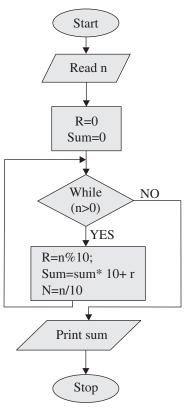
ENDWHILE

Repeat while until the condition fail

WRITE reverse number is sum

Stop

Flowchart



Example 5.7: Find whether the number is prime or not.

Algorithm

Step 1: Start

Step 2: Assign i 2

Step 3: Read n

Step 4: REPEAT Steps 4.1,4.2

UNTILL i < = n-1

Step 4.1: IF (n mod i=0) THEN

Step 4.1.1: print Not Prime

Step 4.1.2: Exit

Step 4.2: i i+1

Step 5: IF(i=n) Then Step 6: Print prime

Step 7: Stop

Pseudo Code

Set intial 2 to i'

Read n

IF (i<-n-1)

IF(n mod i=0)

WRITE "Not Prime"

EXIT

ENDIF

I=i+1

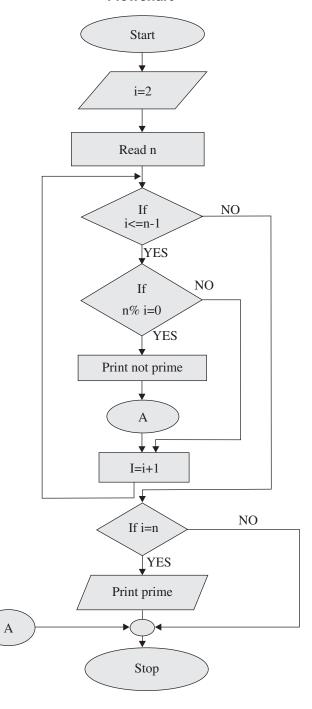
If (i=n)

WRITE "prime"

ENDIF

ENDIF

Stop



Example 5.8: Find the given year is a leap year or not

Algorithm

Step 1-start

Step 2-read the year

Step 3-IF (year mod 4) = 0 THEN print "it is a leap year"

ELSE print "it is not leap year"

Step 4-stop

Pseudo Code

Set initial year

READ the year

IF(year%4==0)THEN no

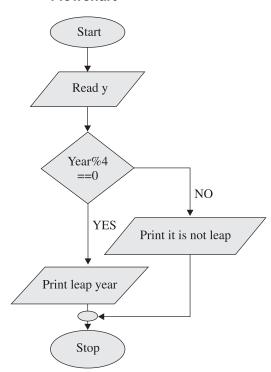
WRITE the year is leap year

ELSE

WRITE the year is not a leap year

ENDIF

Stop



Example 5.9: Find the largest of three numbers

Algorithm

Step 1: Start

Step 2: READ a,b,c

Step 3: IF (a>b) and (a>c) then

Step 3.1: print 'A is Big'

ELSE

Step 4: IF (b>c) then

Step 4.1: print 'B is BIG'

ELSE

Step 4.2: print 'C is Big'

Step 5: Stop

Pseudo Code

Set initial a,b,c

READ the value for a,b,c

IF (a>b and a>c) THEN

WRITE 'A is Big'

ELSE IF (b>c) THEN

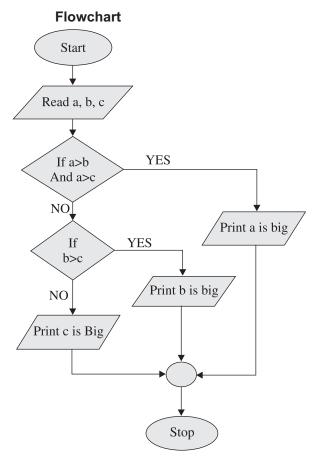
WRITE 'B is Big'

ELSE

WRITE 'C is Big'

ENDIF

Stop



Example 5.10: Find the roots of the quadratic equations.

Algorithm

Step 1: Start

Step 2: Enter the value of a,b,c.

Step 3: FIND the value of D using formula

D=B * B-4*A*C

Step 4: If D is greater than or equal to zero then find two roots

Root 1: (-b + sqrt(d))/(2*a)

Root 2: (-b - sqrt(d))/(2*a)

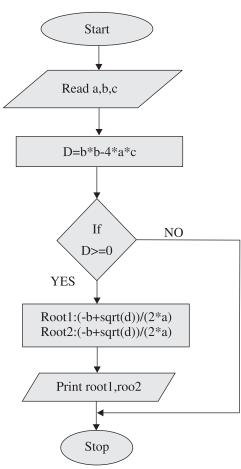
Step 5: Print the two roots root1,root2;

Step 6: if d is not greater than or equal to zero then print the roots are imaginary

Step 7: Stop

Pseudo Code

Set initial zero to 0, root1,root2;
READ the value of a,b,c.
Find
D=b*b-4*a*c
IF D>=0 THEN
Calculate
Root 1: (-b +sqrt(d))/(2*a)
Root 2: (-b -sqrt(d))/(2*a)
ELSE
Roots are imaginary
ENDIF
WRITE root1,root2
Stop



Example 5.11: Fibonacci Series

Algorithm

```
Step1: Start
Step2: Accept the length of the Fibonacci series from user.
Step3: Initialize variable num1=0, num2=1
Step4: Display the values of num1, num2;
Step5: Initialize looping counter i=1
Step6: Repeat steps7-11 while i<=len-2
Step7: Set fab =num1+num2
Step8: Display the value of fab
Step9: Set num1=num2
Step10: Set nnum2=fab
Step11: Increment the value of I by 1
```

Pseudo Code

Step12: Stop

```
BEGIN
```

DEFINE:integer num1,num2,len,I,fab

SET:num1=0,num2=1

DISPLAY:"enter length of the Fibonacci series:"

READ:len

DISPLAY:num1,num2

FOR: I = 1 to len-2

COMPUTE:fab=num1+num2

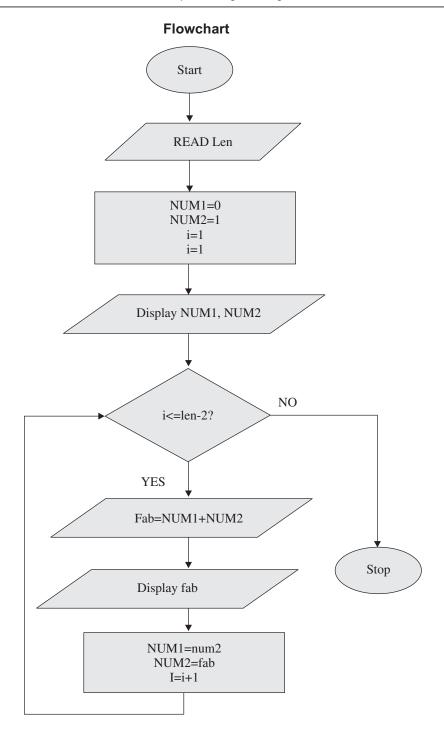
DISPLAY:fab

SET:num1=num2

SET:num2=fab

END FOR

END



Example 5.12: Find the highest marks in a set of n marks.

Algorithm

```
Step 1: Start
```

Step 2: Enter the input set of marks in an array

Step 3: Initialize i =0, high-marks=a[0]

Step 4: IF (i < marks) repeat steps 5 to 7 else go step8

Step 5: If (a[i]>high-marks0,high-marks=a[i]

Step 6: i=i+1

Step 7: Go to Step4

Step 8: Display high-marks

Step 9: Display sum average

Step 10: Stop

Pseudo Code

START

Enter the input values,a[marks]

SET i=0 to marks

For i=0 to marks

If(a[i]>high marks)

High-marks=a[i]

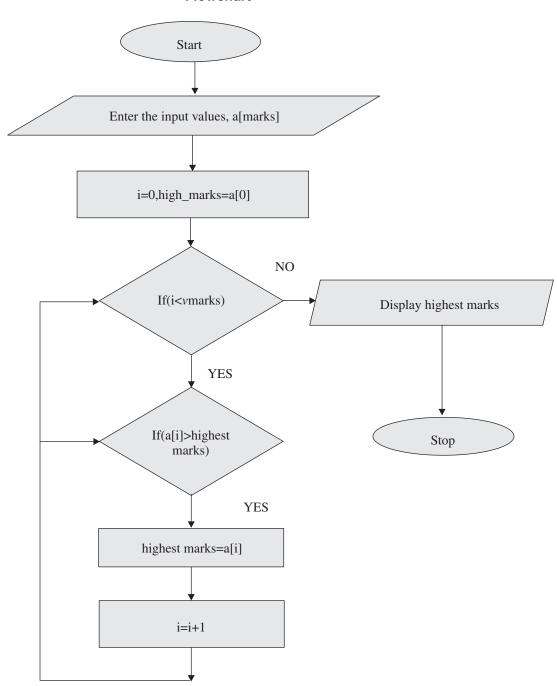
i=i+1

ENDIF

ENDFOR

PRINT high-marks

STOP



Example 5.13: Swap of two variable without using temporary variable.

Algorithm

Step 1: Start the program

Step 2: Read the value of c, d

Step 3: To swap without using another value is

3.1: c = c + d

3.2: d=c-d

3.3: c=c-d

Step 4: Print the values of c and d

Step 5: Stop

Pseudo Code

Set initial c,d

READ the value c,d

To interchange the value use

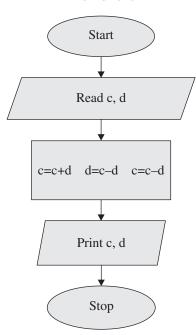
c=c+d

d=c-d

c=c-d

WRITE the values of c,d

STOP



Example 5.14: Sort a list of numbers in ascending order.

Algorithm

```
Step 1: Start
```

Step 2: Enter the unsorted input array a[n]

Step 3: Initialize i=0; j=i+1

Step 4: If (i<n-1) repeat steps 5 and 8 else goto step 8

Step 5: If (i>n-1) repeat steps 6 and 7 else goto 4

Step 6: If a[i] is greater than a[j], exchange their positions

Step 7: Increment i and j

Step 8: Goto step 4

Step 9: Display the array a[j], i=1 to n

Step 10: Stop

Pseudo Code

START

Read a[n]

For i=0 to n-1

For j=i+1 to n

If (a[i] < a[j])

temp = a[i]

a[i] = a[j]

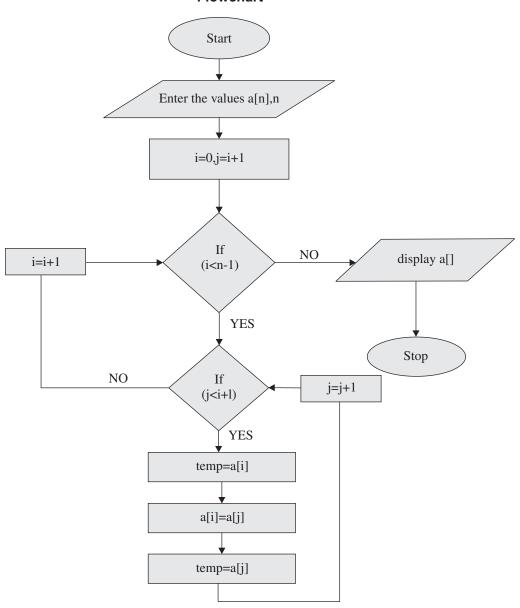
a[j] = temp

Endfor

Endfor

Print a[i], for i=1 to n

STOP



Example 5.15: Determine a student's final grade and indicate whether he/she is passing or failing. The final grade is calculated as the average of four marks.

Algorithm

Step 1: Input M1,M2,M3,M4v (M1+M2+M3+M4)/4

Step 2: GRADE

Step 3: If (GRADE < 50) then Print "FAIL"

else Print "PASS"

endif

Pseudo Code

Input a set of 4 marks

Calculate their average by summing and dividing by 4

if average is below 50 Print "FAIL" else Print "PASS"

