SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME :23ITT101 Problem Solving and C Programming

I YEAR /I SEMESTER

Unit 1- INTRODUCTION TO PROBLEM SOLVING TECHNIQUES

Topic 8: Illustrative problems

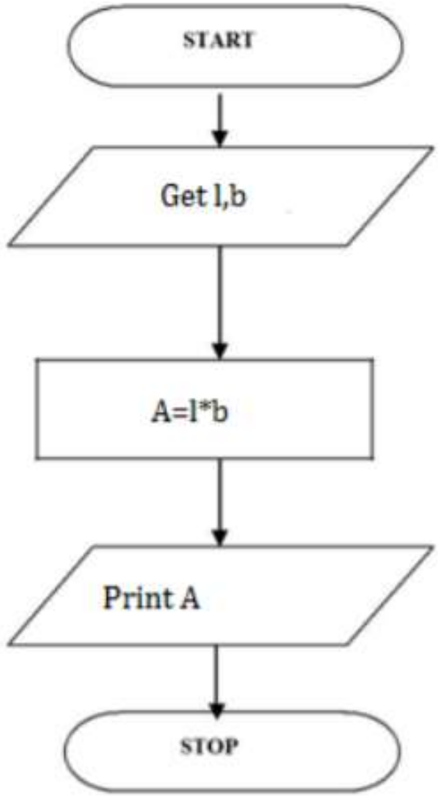
10 October 2024

Examples

Area of Triangle

Write an algorithm to find area of a rectangle

Step 1: Start
Step 2: get l,b values
Step 3: Calculate A=l*b
Step 4: Display A
Step 5: Stop

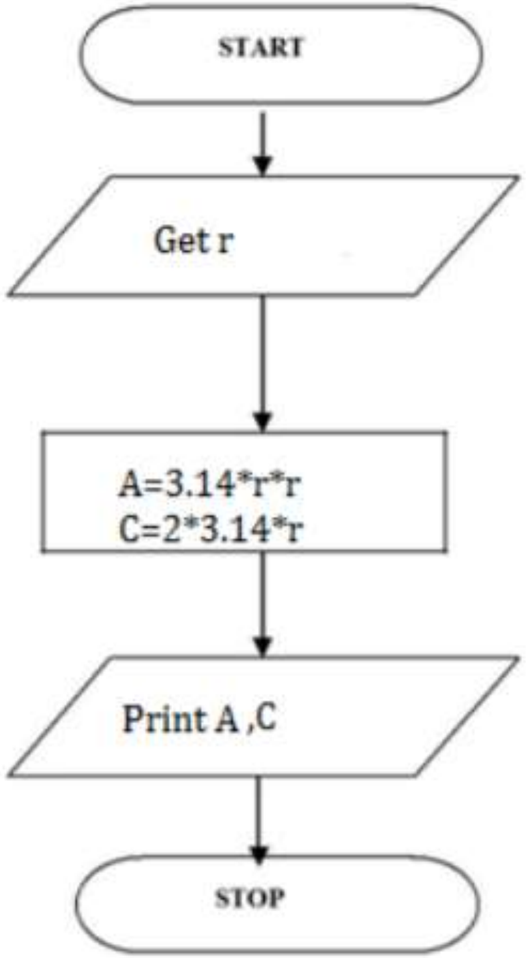


BEGIN
READ l,b
CALCULATE A=l*b
DISPLAY A
END

Area and circumference of circle

Write an algorithm for Calculating area and circumference of circle

Step 1: Start
Step 2: get r value
Step 3: Calculate A=3.14*r*r
Step 4: Calculate C=2.3.14*r
Step 5: Display A,C
Step 6: Stop

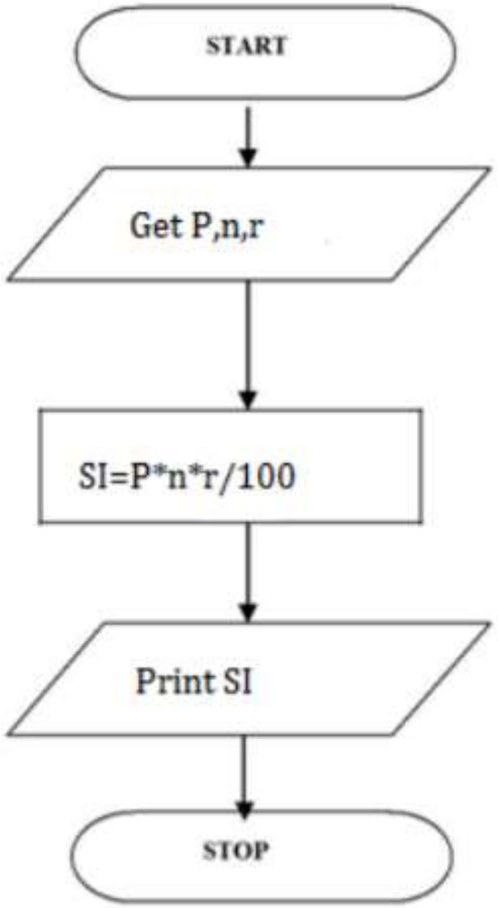


BEGIN
READ r
CALCULATE A and C
A=3.14*r*r
C=2*3.14*r
DISPLAY A
END

Simple Interest

Write an algorithm for Calculating simple interest

Step 1: Start
Step 2: get P, n, r value
Step3: Calculate
SI=(p*n*r)/100
Step 4: Display S
Step 5: Stop



BEGIN
READ P, n, r
CALCULATE S
SI=(p*n*r)/100
DISPLAY SI
END

Greatest of two numbers

Algorithm

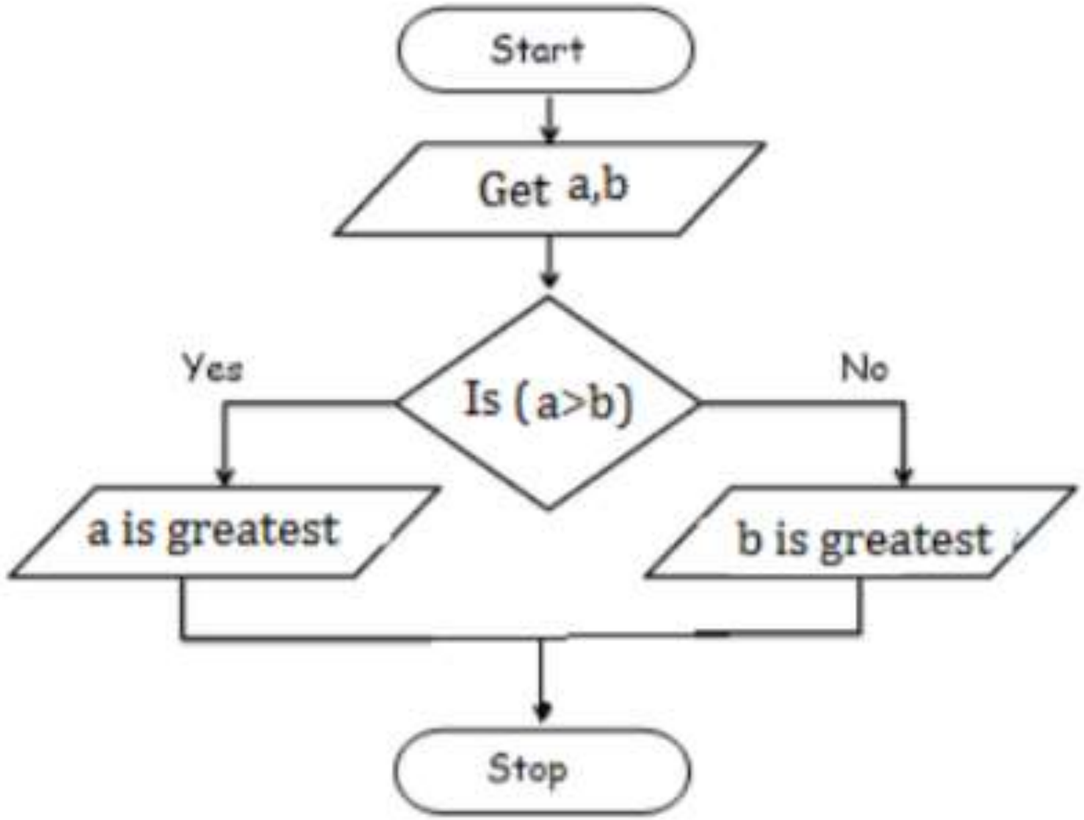
To check greatest of two numbers
Step 1: Start
Step 2: get a,b value
Step 3: check if(a>b) print a is greater
Step 4: else b is greater
Step 5: Stop

Pseudocode

```
BEGIN
READ a,b
IF (a>b) THEN
DISPLAY a is greater
ELSE
DISPLAY b is greater
END IF
END
```

Conti…

Flowchart

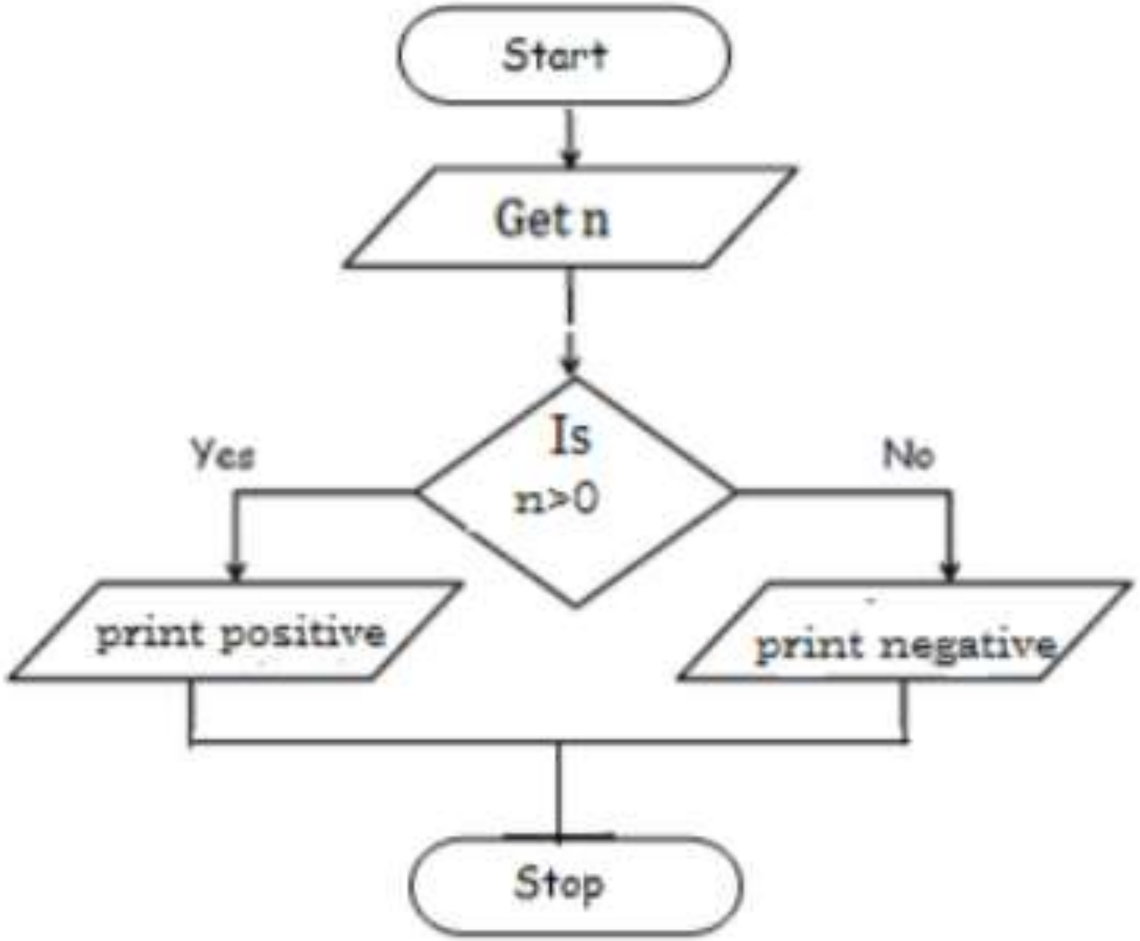


Positive and Negative number

To check positive or negative number
Step 1: Start **Step 2:** get num **Step 3:** check if(num>0) print a is positive **Step 4:** else num is negative **Step 5:** Stop

BEGIN
READ num
IF (num>0) THEN
DISPLAY num is positive
ELSE
DISPLAY num is negative
END IF
END

Conti...

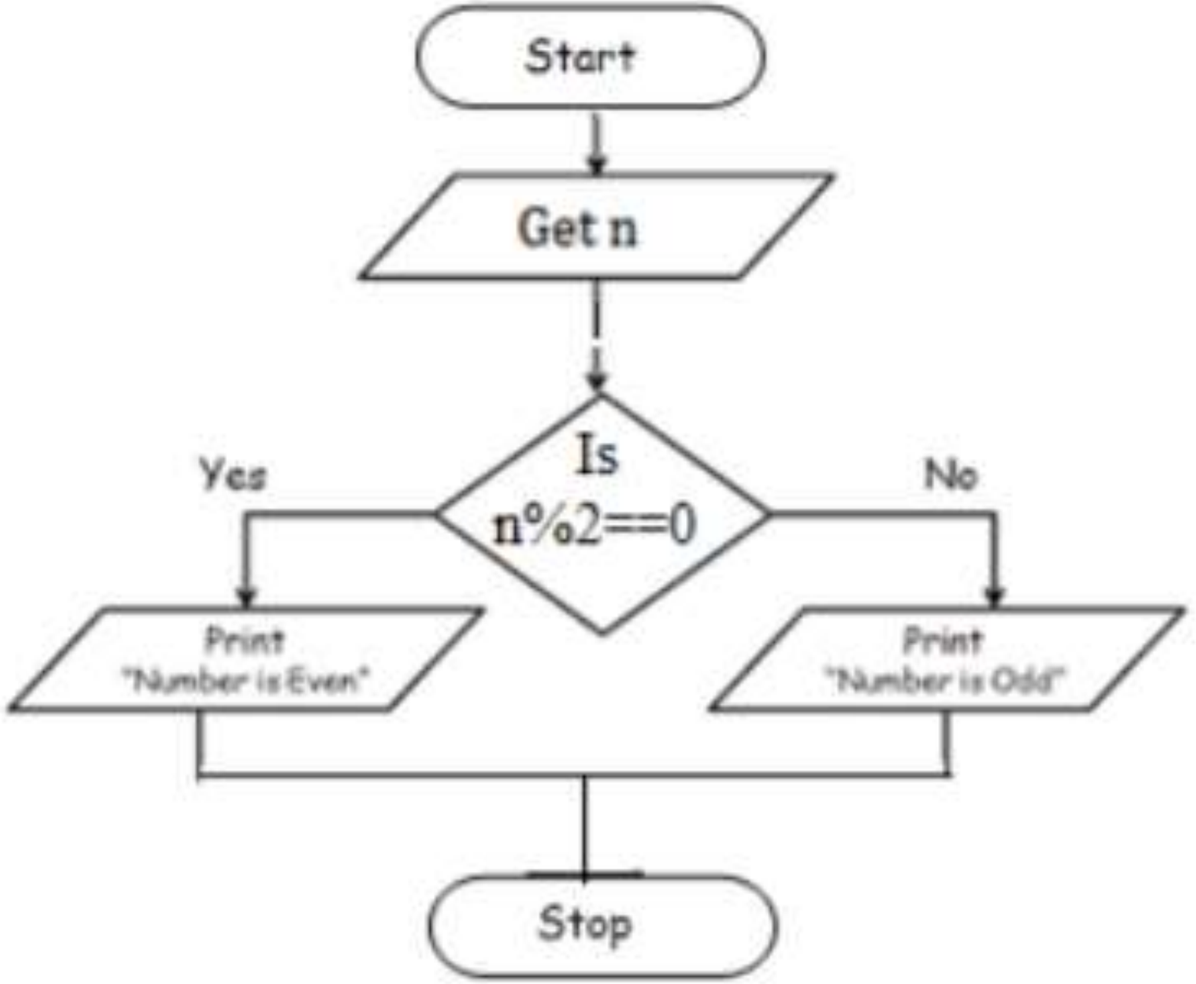


Even or Odd number

To check odd or even number
Step 1: Start Step 2: get num Step 3: check if(num%2==0) print num is even Step 4: else num is odd Step 5: Stop

BEGIN
READ num
IF (num%2==0) THEN
DISPLAY num is even
ELSE
DISPLAY num is odd
END IF
END

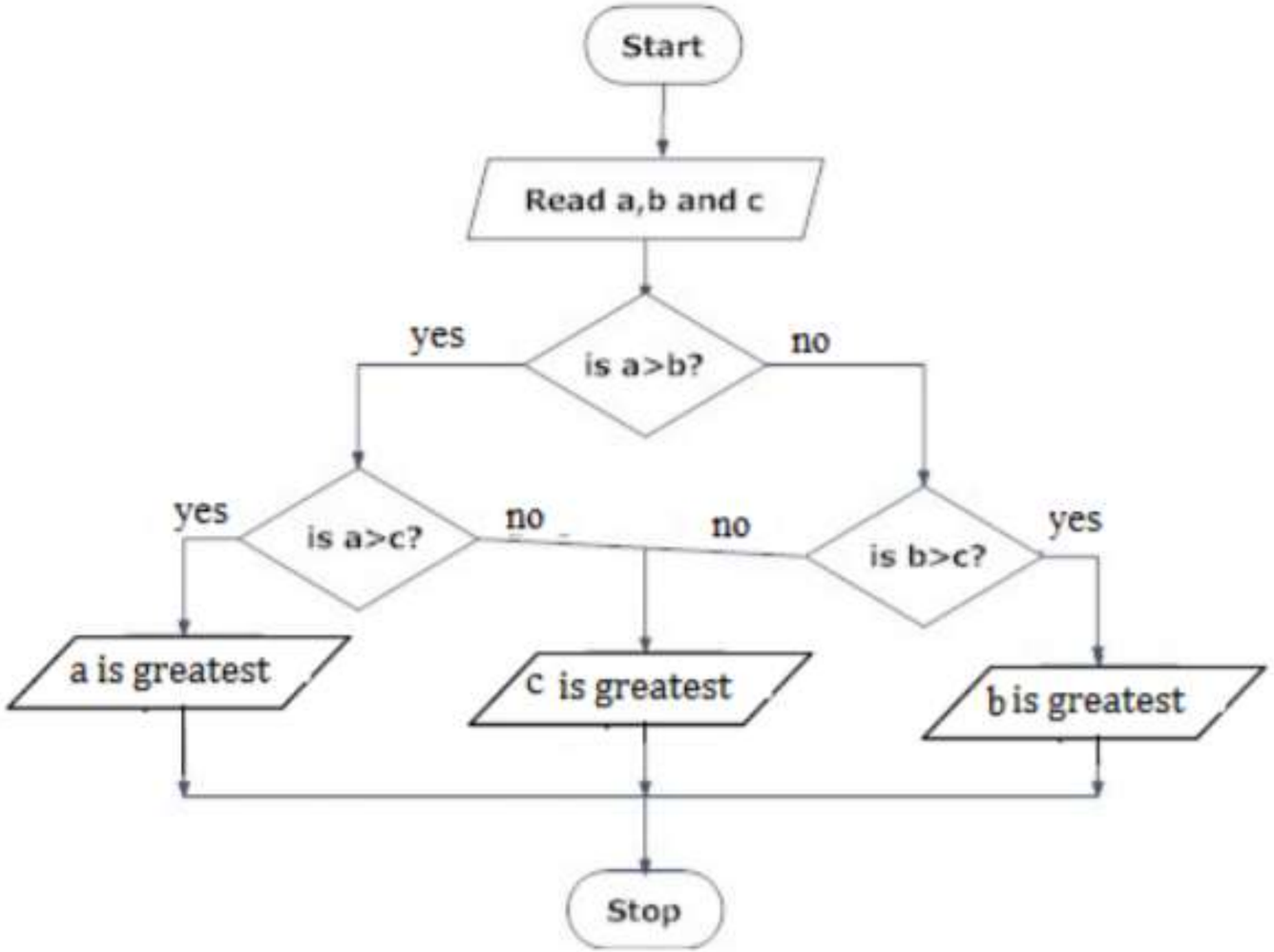
Conti...


Start
Get n
Is
n%2==0
Yes
No
Print
"Number is Even"
Print
"Number is Odd"
Stop

Greatest of 3 numbers

To check greatest of three numbers
Step1: Start
Step2: Get A, B, C
Step3: if(A>B) goto Step4 else goto step5
Step4: If(A>C) print A else print C
Step5: If(B>C) print B else print C
Step6: Stop

Conti...


Start
Read a,b and c
is a>b?
yes
no
is a>c?
yes
no
is b>c?
no
yes
a is greatest
c is greatest
b is greatest
Stop

Conti...

```
BEGIN
READ a, b, c
IF (a>b) THEN
    IF(a>c) THEN
        DISPLAY a is greater
    ELSE
        DISPLAY c is greater
    END IF
ELSE
    IF(b>c) THEN
        DISPLAY b is greater
    ELSE
        DISPLAY c is greater
    END IF
END IF
END
```

Examples

check whether given number is +ve, -ve or zero.

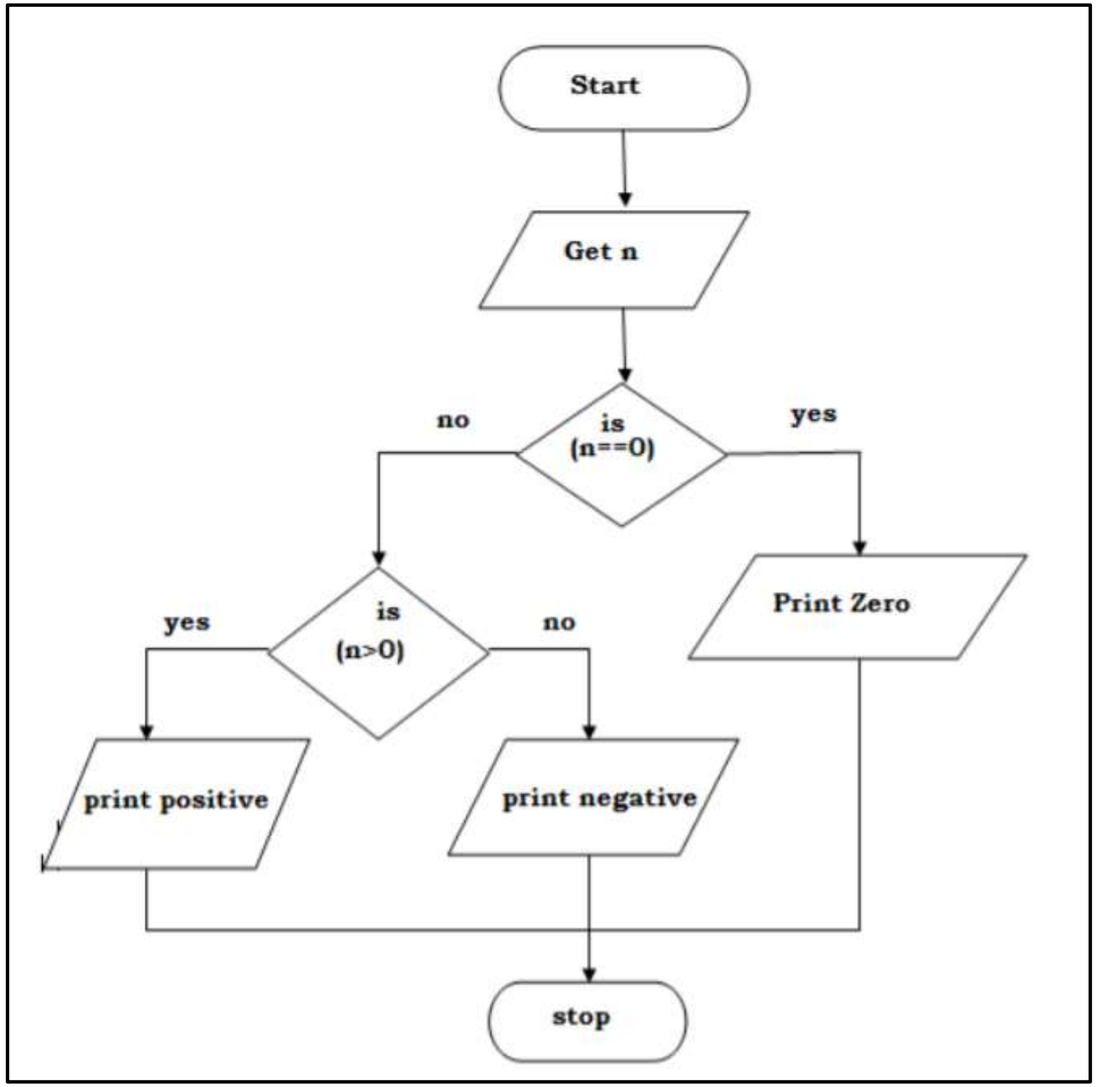
Write an algorithm to check whether given number is +ve, -ve or zero.
Step 1: Start
Step 2: Get n value.
Step 3: if (n ==0) print "Given number is Zero" Else goto step4
Step 4: if (n > 0) then Print "Given number is +ve"
Step 5: else Print "Given number is -ve"
Step 6: Stop

Conti…

```
BEGIN
GET n
IF(n==0) THEN
    DISPLAY " n is zero"
ELSE
    IF(n>0) THEN
        DISPLAY "n is positive"
    ELSE
        DISPLAY "n is  negative "
     END IF
END IF
END
```

Examples

check whether given number is +ve, -ve or zero.



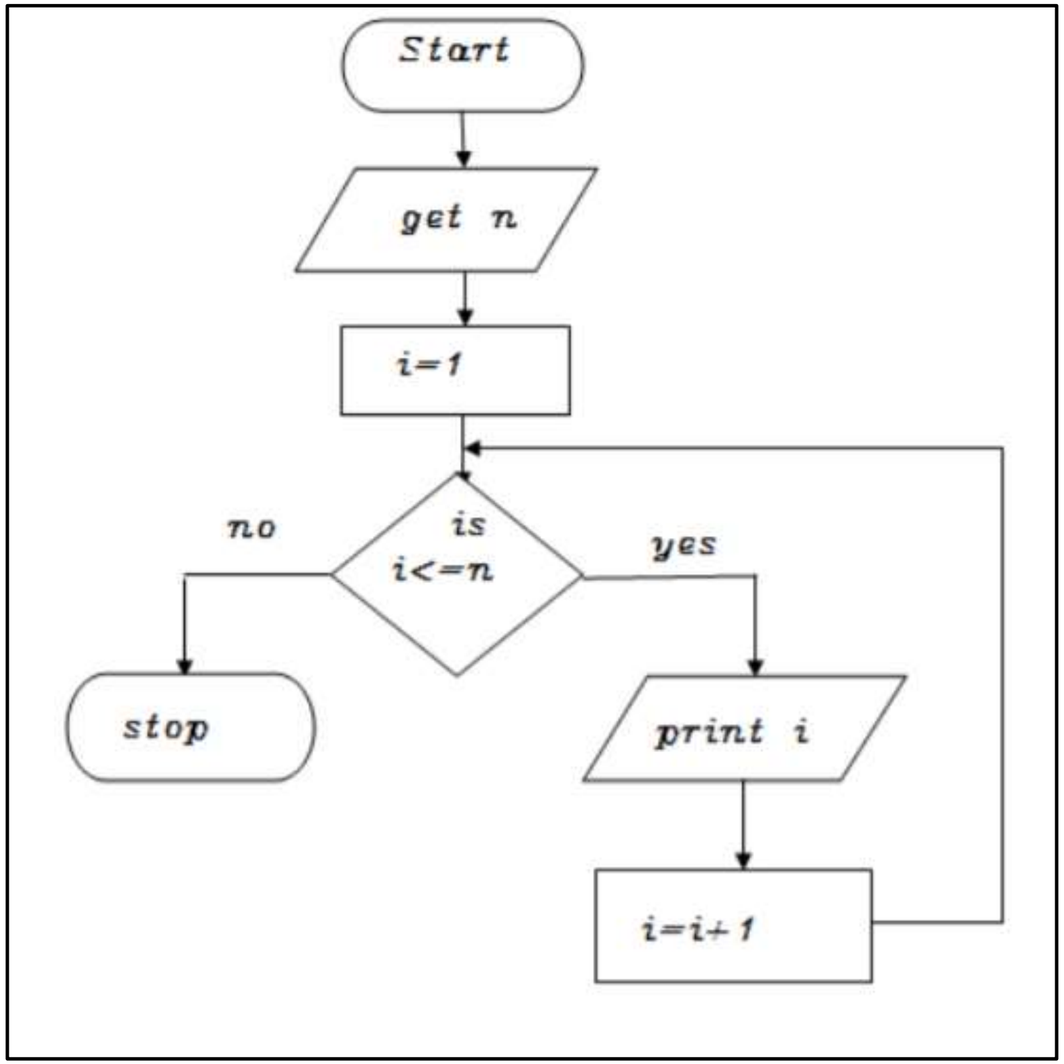
Print all natural numbers up to n

Write an algorithm to print all natural numbers up to n

Step 1: Start
Step 2: get n value.
Step 3: initialize i=1
Step 4: if (i<=n) go to step 5 else go to step 8
Step 5: Print i value
step 6 : increment i value by 1
Step 7: go to step 4
Step 8: Stop

```
BEGIN
GET n
INITIALIZE i=1
WHILE(i<=n) DO
    PRINT i
    i=i+1
ENDWHILE
END
```

Examples
check whether given number is +ve, -ve or zero.

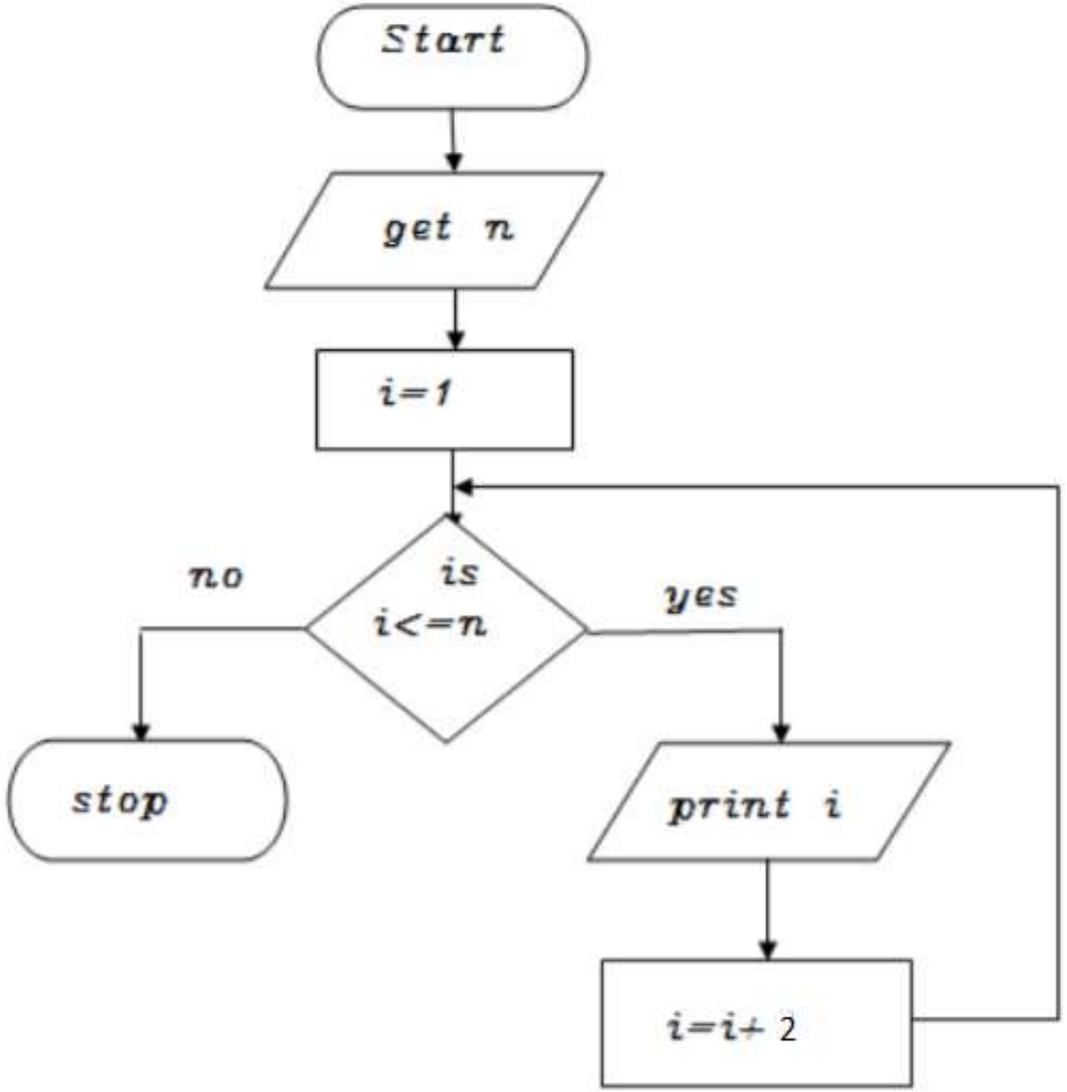


Print n odd numbers

Step 1: start
step 2: get n value
step 3: set initial value i=1
step 4: check if(i<=n) goto step 5 else goto step 8
step 5: print i value
step 6: increment i value by 2
step 7: goto step 4
step 8: stop

```
BEGIN
GET n
INITIALIZE i=1
WHILE(i<=n) DO
    PRINT i
    i=i+2
ENDWHILE
END
```

Examples



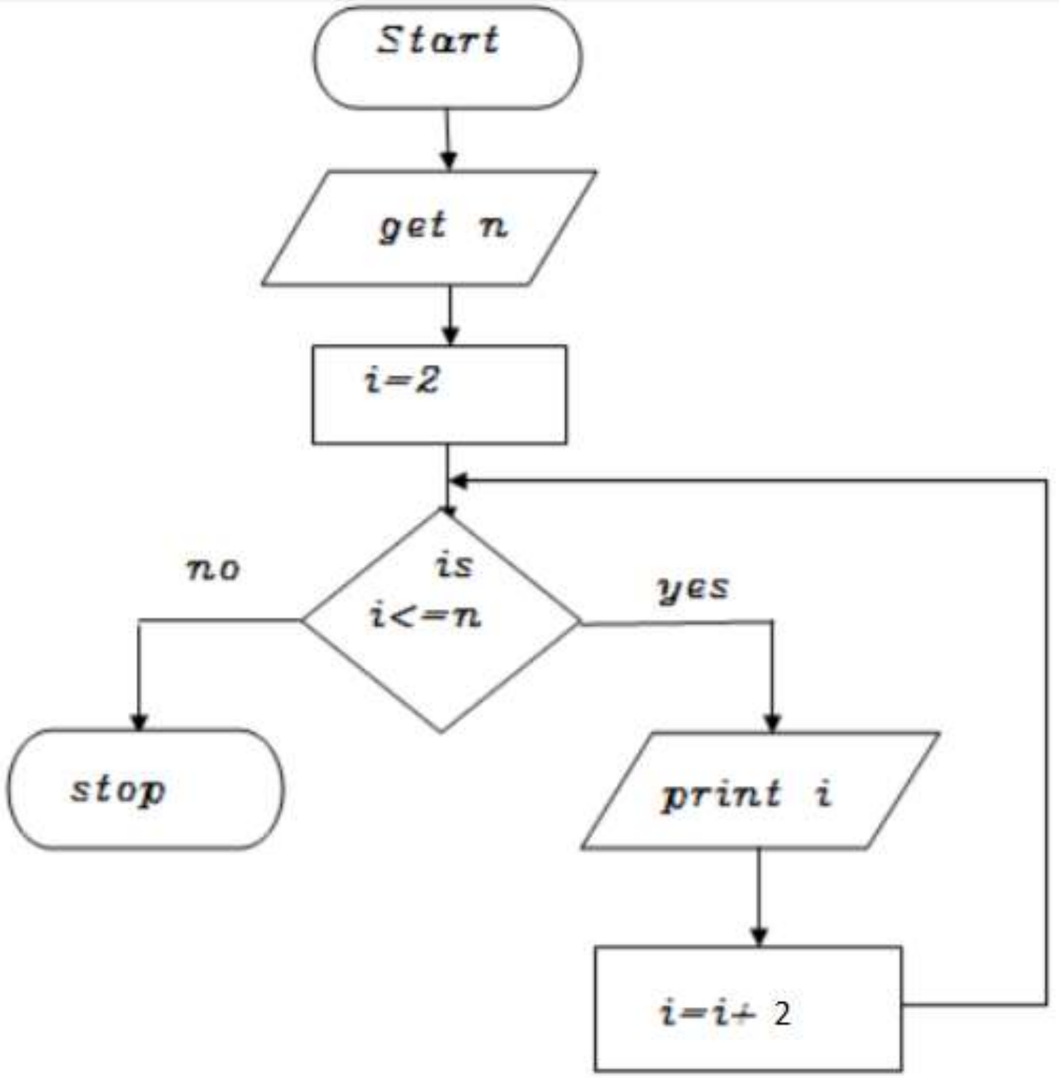
Print n even numbers

Write an algorithm to print n even numbers

Step 1: start
step 2: get n value
step 3: set initial value i=2
step 4: check if(i<=n) goto step 5 else goto step8
step 5: print i value
step 6: increment i value by 2
step 7: goto step 4
step 8: stop

```
BEGIN
GET n
INITIALIZE i=2
WHILE(i<=n) DO
    PRINT i
    i=i+2
ENDWHILE
END
```

Examples

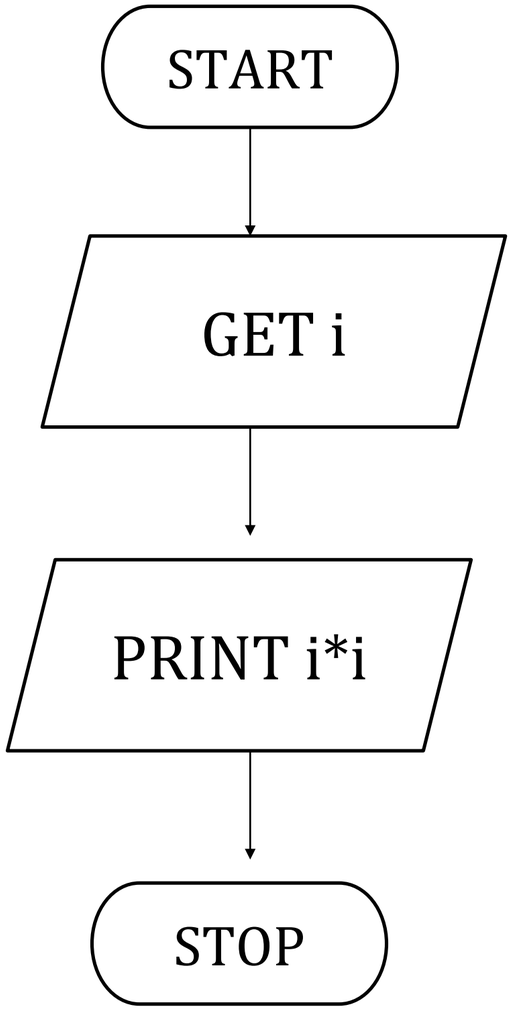


print squares of a number

Step 1: Start
Step 2: Get the value, let it be i
Step 3: print i*i
Step 4 : Stop

BEGIN
GET i
PRINT i*I
END

Conti...



Print cubes of a number

- Follow the instruction as previous example
- Just do cube operation (i*i*i)

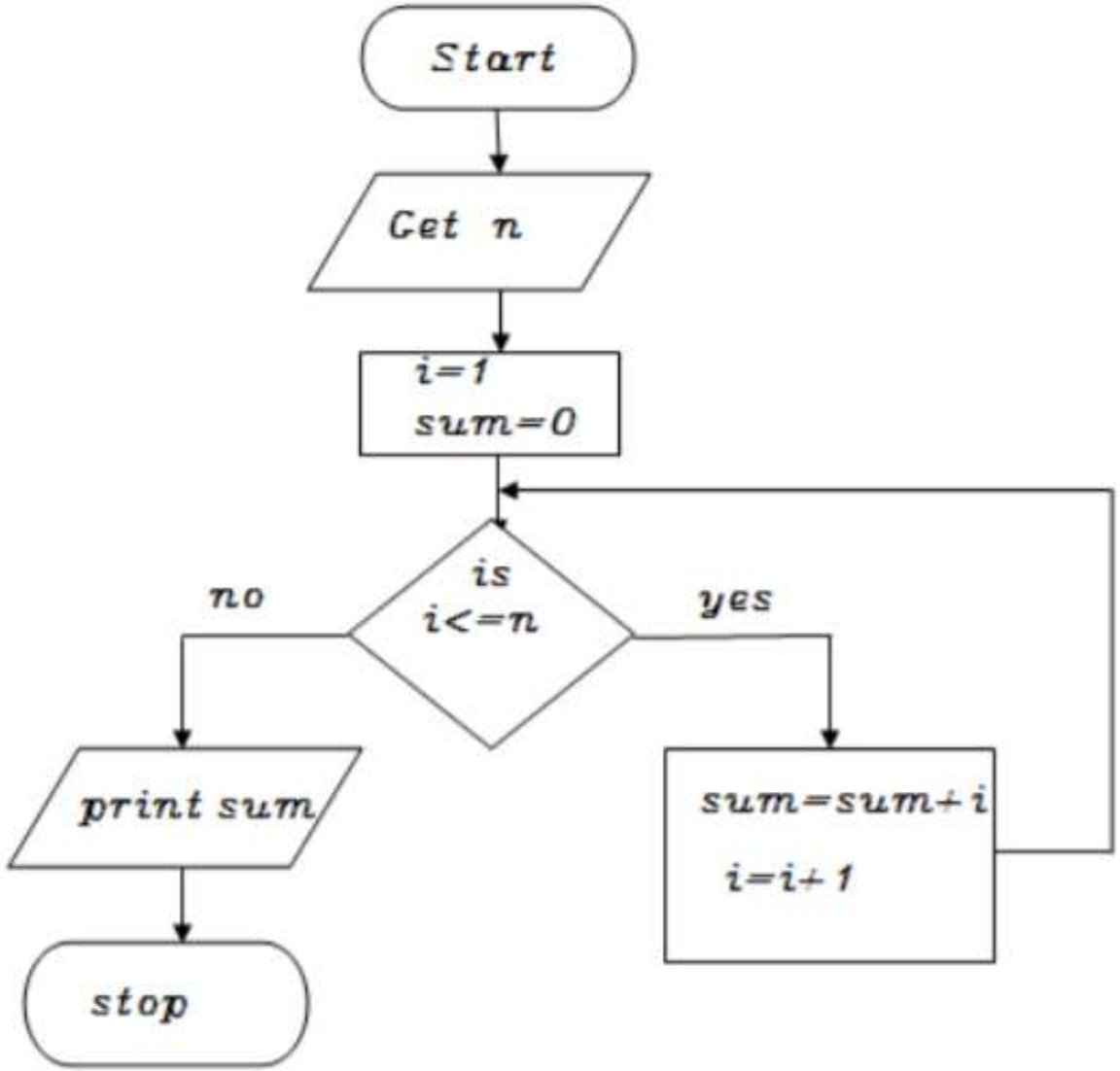
find sum of a given number

Write an algorithm to find sum of a given number

Step 1: start
step 2: get n value
step 3: set initial value i=1, sum=0
Step 4: check i value if(i<=n) goto step 5 else goto step8
step 5: calculate sum=sum+i
step 6: increment i value by 1
step 7: goto step 4
step 8: print sum value
step 9: stop

```
BEGIN
GET n
INITIALIZE i=1,sum=0
WHILE(i<=n) DO
    sum=sum+i
    i=i+1
ENDWHILE
PRINT sum
END
```

Conti...



Assessment 1

1. Write algorithm, flowchart and pseudocode?

Ans : _____

References

TEXT BOOKS

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2.Ashok.N.Kamthane,“ Computer Programming”, Pearson Education (India) (2010). (UNIT –II, III IV, V)

3.Reema Thareja, “Programming in C”, 2nd Edition, Oxford University Press,(2015). (UNIT –I,II, III, IV, V)

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1.Byron Gottfried, “Programming with C”, 2nd Edition, (Indian Adapted Edition), TMH Publications, (2006). (Unit II, III, IV)

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3.P.Sudharson, “Computer Programming”, RBA Publications (2008), (UNIT I, II, III, IV)

4.Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 2014.(Unit II, III, IV, V)

5.Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011. (UNIT – I, II, III, IV, V)

Thank You