**UPES**

**PROGRAMMING IN C**

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BATCH: -15

COURSE: -B. TECH CSE

SCHOOL: - SCHOOL OF COMPUTER SCIENCE

SUBMITTED TO: - MS. GAYTRI MAM

EXPERIMENT NO: 01

ALGORITHM AND FLOWCHART

OBJECTIVE: To design the various problems using the various problem solving technique algorithm and flowchart.

QUESTION:1 Calculate the circumference and area of a circle (pi = 3.142).

1.ALGORITHM: -

* Get the radius (r) of circle
* Set π = 3.142
* Calculate the circumference using the formula:
* Circumference = 2\*π\*r
* Calculate the area using the formula:
* Area = π\*r\*r
* Show the circumference and area

2.STRUCTURE CHART :-

3.FLOW CHART :-

* Start 🡪
* Input Radius (r) 🡪
* π = 3.142🡪
* Circumference = 2 \* π \* r 🡪
* Area = π \* r \* r 🡪
* Output Circumference🡪
* Output Area 🡪
* Stop

4.PSEUDOCODE: -

* Start
* Declare radius, π, circumference, area;
* Fixed value of π = 3.142
* Display = Enter the radius of the circle ;
* Input radius (r)
* Circumference = 2\* π\*r
* Area = π\*r\*r
* Output = Circumference
* = Area
* End

QUESTION: 2 Compute and display the letter grade of student's mark in certain course.

1.ALGORITHM: -

1. Input student’s marks
2. Marks >= 90. Grade = A
3. Marks >= 80. Grade = B
4. Marks >= 70. Grade = C
5. Marks >= 60. Grade = D
6. Otherwise = F. ON ABSENT ALSO
7. Display Grade

2.STRUCTURE: -

3.FLOW CHART: -

* Start 🡪
* Input Student Mark 🡪
* Mark >= 90 🡪

Yes. Grade = A

No

* Mark >= 80🡪

Yes. Grade = B

No

* Mark >= 70🡪

Yes. Grade =C

No

* Mark >=60🡪

Yes. Grade =D

No

* Otherwise = F. ON ABSENT ALSO🡪
* Display Grade🡪
* Stop

4.PSEUDOCODE: -

START

DECLARE mark, grade

DISPLAY "Enter student's mark:"

INPUT mark

mark >= 90 THEN

grade = "A"

mark >= 80 THEN

grade = "B"

mark >= 70 THEN

grade = "C"

mark >= 60 THEN

grade = "D"

grade = "F". ON ABSENT ALSO.

END I

DISPLAY student's grade is

STOP

QUESTION: 3 Compute and print the net pay of an employee given the number of hour worked and the hourly rate of pay.

1.ALGORITHM: -

1. Input number of hours worked
2. Hourly rate
3. Calculate payment = hours worked\*hourly rate
4. Display net payment

2.STRUCTURE CHART: -

3.FLOW CHART: -

[Start]

|

v

[Input Hours Worked]

|

v

[Input Hourly Rate]

|

V

[Calculate payment = hours worked \* hourly rate]

|

V

[ Display payment ]

|

V

[Stop ]

4.PSEUDOCODE: -

1. Start
2. Input hours worked
3. Input hourly rate
4. Calculate payment
5. Display payment
6. Stop

QUESTION 4: Convert the temperature given in degrees Fahrenheit to degree Celsius given that: Degree Celsius = (Degree Fahrenheit – 32) \* 5/9

1.ALGORITHM: -

1. Start**:**
2. Input temperature in Fahrenheit (F)
3. Apply the formula: C = (F – 32) × 5/9
4. Output the temperature in Celsius (C)
5. Stop

2.STRUCTURE CHART: -

3.FLOWCHART: -

START

INPUT IN FAHERNHEIT

C = (F – 32) × 5/9

STOP

OUTPUT IN CELSIUS

4.PSEUDOCODE: -

Start

Enter temperature in Fahrenheit:"

INPUT Fahrenheit

C = (F – 32) × 5/9

Temperature in Celsius is

Stop

QUESTION 5: Obtain the required inputs and compute the areas of the following shapes: (i) Parallelogram (with base and height), (ii) Trapezoid (with height, long base, short base), (iii) Rhombus (with height and side), (iv) Sphere (with radius), (v) Ellipse (with major and minor radius).

1.ALGORITHM: -

1. Parallelogram  
   Area = base × height
2. Trapezoid  
   Area = 0.5 × (base1 + base2) × height
3. Rhombus (with height and side)  
   Area = base × height  
   (Note: In rhombus, all sides are equal; using one as base)
4. Sphere (Surface Area)  
   Area = 4 × π × radius²
5. Ellipse  
   Area = π × major radius × minor radius

Start  
 Input required dimensions for each shape

Compute areas using respective formula

Output areas  
 Stop

2.STRUCTURE CHART: -

3.FLOWCHART: -

START

INPUT BASE, HEIGHT, RADIUS, SHORT BASE ,SIDE ,MAJOR RADIUS ,MINOR RADIUS

1. Parallelogram  
   Area = base × height
2. Trapezoid  
   Area = 0.5 × (base1 + base2) × height
3. Rhombus (with height and side)  
   Area = base × height  
   (Note: In rhombus, all sides are equal; using one as base)
4. Sphere (Surface Area)  
   Area = 4 × π × radius²
5. Ellipse  
   Area = π × major radius × minor radius

DISPLAY OUTPUT

END

4.PSEUDOCODE: -

* Start
* INPUT BASE , HEIGHT, RADIUS ,SHORT BASE ,SIDE ,MAJOR RADIUS ,MINOR RADIUS
* Parallelogram  
  Area = base × height
* Trapezoid  
  Area = 0.5 × (base1 + base2) × height
* Rhombus (with height and side)  
  Area = base × height  
  (Note: In rhombus, all sides are equal; using one as base)
* Sphere (Surface Area)  
  Area = 4 × π × radius²
* Ellipse  
  Area = π × major radius × minor radius
* Display output
* End

QUESTION 6: Given two numbers. Demonstrate the swapping of the values using a third variable

1.ALGORITHM:

1. Input A and B
2. Set TEMP = A
3. Set A = B
4. Set B = TEMP
5. Output A and B

2.STRUCTURE CHART:

3.FLOWCHART:

[Start]

[Input A, B]

[TEMP = A]

[A = B]

[B = TEMP]

[Output A, B]

[End]

4.PSEUDOCODE:

* Start
* Input a, b
* a=b
* b=temp
* Print output
* Stop

QUESTION 7: Print the given days in years-month-days format. E.g. 396 days = 1 year, 1 month, 1 day

1.ALGORITHM:

1. Input total number of days
2. Compute number of years = total days ÷ 365
3. Find remaining days = total days mod 365
4. Compute number of months = remaining days ÷ 30
5. Find final remaining days = remaining days mod 30
6. Display years, months, days

2.STRUCTURE CHART:

3.FLOWCHART:

START

INPUT DAYS

YEARS = DAYS /365

Remaining days = n mod 365

Months = Remaining Days / 30

Days = Remaining Days mod 30

Print Years, Months, Days

STOP

4.PSEUDOCODE:

Start

Input days

Years =days/365

Reaming days mod 365

Months = remaining days /30

Days = remaining days mod 30

Print years , months , days

stop