LET US C: WEEK 1 SOLVED PROBLEMS

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1)Ramesh’s basic salary is input through the keyboard. His dearness

allowance is 40% of basic salary, and house rent allowance is 20% of

basic salary. Write a program to calculate his gross salary.

#include <stdio.h>

int main() {

float basic\_salary, gross\_salary, da, hra;

printf("Enter Ramesh's basic salary: ");

scanf("%f", &basic\_salary)  
 da = 0.4 \* basic\_salary;

hra = 0.2 \* basic\_salary;

gross\_salary = basic\_salary + da + hra;

printf("Ramesh's gross salary is: %f\n", gross\_salary);

return 0;

}  
  
  
2)The distance between two cities (in kilometers) is input through the

keyboard. Write a program to convert and print this distance in meters,

feet, inches and centimeters.

# include <stdio.h>

int main( )

{

float km, m , cm, ft, inch ;

printf ( "\nEnter the distance in Kilometers: " ) ;

scanf ( "%f", &km ) ;

m = km \* 1000 ;

cm = m \* 100 ;

inch = cm / 2.54 ;

ft = inch / 12 ;

printf ( "Distance in meters = %f\n", m ) ;

printf ( "Distance in centimeter = %f\n", cm ) ;

printf ( "Distance in feet = %f\n", ft ) ;

printf ( "Distance in inches = %f\n", inch ) ;

return 0 ;

}  
  
3) Temperature of a city in Fahrenheit degrees is input through the

keyboard. Write a program to convert this temperature into

Centigrade degrees.   
  
#include <stdio.h>

int main() {

float fahrenheit, celsius;

printf("Enter temperature in Fahrenheit: ");

scanf("%f", &fahrenheit);  
 celsius = (fahrenheit - 32) \* 5 / 9;

printf("Temperature in Celsius: %.2f\n", celsius);

return 0;

}

4) The length and breadth of a rectangle and radius of a circle are

input through the keyboard. Write a program to calculate the area

and perimeter of the rectangle, and the area and circumference of

the circle.

#include <stdio.h>

int main() {

float length, breadth, radius;

float rectangle\_area, rectangle\_perimeter, circle\_area, circle\_circumference;

printf("Enter length of rectangle: ");

scanf("%f", &length);

printf("Enter breadth of rectangle: ");

scanf("%f", &breadth);

printf("Enter radius of circle: ");

scanf("%f", &radius);

rectangle\_area = length \* breadth;

rectangle\_perimeter = 2 \* (length + breadth);

circle\_area = 3.14 \* radius \* radius;

circle\_circumference = 2 \* 3.14 \* radius;

printf("Area of rectangle: %.2f\n", rectangle\_area);

printf("Perimeter of rectangle: %.2f\n", rectangle\_perimeter);

printf("Area of circle: %.2f\n", circle\_area);

printf("Circumference of circle: %.2f\n", circle\_circumference);

return 0;

}

5) Paper of size A0 has dimensions 1189 mm x 841 mm. Each

subsequent size A(n) is defined as A(n-1) cut in half, parallel to its

shorter sides. Thus, paper of size A1 would have dimensions 841

mm x 594 mm. Write a program to calculate and print paper sizes

A0, A1, A2, … A8.

#include <stdio.h>

int main() {

int n;

int width = 1189, height = 841; // Dimensions of A0

printf("Paper Size A0: %dmm x %dmm\n", width, height);

for (n = 1; n <= 8; n++) {

int newWidth = height;

int newHeight = width / 2;

width = newWidth;

height = newHeight;

printf("Paper Size A%d: %dmm x %dmm\n", n, width, height);

}

return 0;

}  
  
6)If lengths of three sides of a triangle are input through the keyboard,

write a program to find the area of the triangle.

Program

# include <stdio.h>

# include <math.h> /\* for sqrt( ) \*/

int main( )

{

float a, b, c, sp, area ;

printf ( "\nEnter sides of a triangle: " ) ;

scanf ( "%f %f %f", &a, &b, &c ) ;

sp = ( a + b + c ) / 2 ;

area = sqrt ( sp \* ( sp - a ) \* ( sp - b ) \* ( sp - c ) ) ;

printf ( "Area of triangle = %f\n", area ) ;

return 0 ;

}

7)If a five-digit number is input through the keyboard, write a program to

reverse the number

# include <stdio.h>

int main( )

{

int n, d5, d4, d3, d2, d1 ;

long int revnum ;

printf ( "\nEnter a five digit number (less than 32767): " ) ;

scanf ( "%d", &n ) ;

d5 = n % 10 ; /\* 5th digit \*/

n = n / 10 ; /\* remaining digits \*/

d4 = n % 10 ; /\* 4th digit \*/

n = n / 10 ; /\* remaining digits \*/

d3 = n % 10 ; /\* 3rd digit \*/

n = n / 10 ; /\* remaining digits \*/

d2 = n % 10 ; /\* 2nd digit \*/

n = n / 10 ; /\* remaining digits \*/

d1 = n % 10 ; /\* 1st digit \*/

revnum = d5 \* 10000 + d4 \* 1000 + d3 \* 100 + d2 \* 10 + d1 ;

printf ( "The reversed number is %ld\n", revnum ) ;

return 0 ;

}

8)Consider a currency system in which there are notes of six

denominations, namely, Re. 1, Rs. 2, Rs. 5, Rs. 10, Rs. 50, Rs. 100. If a

sum of Rs. N is entered through the keyboard, write a program to

compute the smallest number of notes that will combine to give Rs. N.

#include <stdio.h>

int main( )

{

int amount, nohun, nofifty, noten, nofive, notwo, noone, total ;

printf ( "Enter the amount: " ) ;

scanf ( "%d", &amount ) ;

nohun = amount / 100 ;

amount = amount % 100 ;

nofifty = amount / 50 ;

amount = amount % 50 ;

noten = amount / 10 ;

amount = amount % 10 ;

nofive = amount / 5 ;

amount = amount % 5 ;

notwo = amount / 2 ;

amount = amount % 2 ;

noone = amount / 1 ;

amount = amount % 1 ;

total = nohun + nofifty + noten + nofive + notwo + noone ;

printf ( "Smallest number of notes = %d\n", total ) ;

return 0 ;

}   
  
9) If a five-digit number is input through the keyboard, write a

program to calculate the sum of its digits. (Hint: Use the modulus

operator %)

#include <stdio.h>

int main() {

int number, sum = 0;

printf("Enter a five-digit number: ");

scanf("%d", &number);

while(number != 0) {

sum += number % 10;

number /= 10;

}

printf("Sum of digits = %d\n", sum);

return 0;

}

10) Write a program to receive Cartesian co-ordinates (x, y) of a point

and convert them into polar co-ordinates (r, op).

Hint: r = sqrt(x² + y²) and Q = tan¹¹ (y/x)

#include <stdio.h>

#include <math.h>

int main() {

float x, y, r, theta;

printf("Enter the Cartesian coordinates (x, y): ");

scanf("%f %f", &x, &y);

r = sqrt(x\*x + y\*y);

theta = atan(y / x);

printf("Polar coordinates: (r, theta) = (%f, %f)\n", r, theta);

return 0;

11) Write a program to receive values of latitude (L1, L2) and longitude

(G1, G2), in degrees, of two places on the earth and output the

distance (D) between them in nautical miles. The formula for

distance in nautical miles is:

D = 3963 cos¹ (sin L1 sin L2 + cos L1 cos L2 \* cos (G2 - G1 ) )

#include <stdio.h>

#include <math.h>

int main() {

float L1, L2, G1, G2, D;

printf("Enter latitude and longitude of two places in degrees: ");

scanf("%f %f %f %f", &L1, &L2, &G1, &G2);

D = 3963 \* acos(sin(L1) \* sin(L2) + cos(L1) \* cos(L2) \* cos(G2 - G1));

printf("Distance in nautical miles: %f\n", D);

return 0;

}

12) Wind-chill factor is the felt air temperature on exposed skin due to

wind. The wind-chill temperature is always lower than the air

temperature, and is calculated as per the following formula:

wcf = 35.74 +0.6215t + (0.4275t - 35.75) \* v0.16

where t is temperature and v is wind velocity. Write a program to

receive values of t and v and calculate wind-chill factor (wcf).

#include <stdio.h>

#include <math.h>

int main() {

float t, v, wcf;

printf("Enter temperature (t) and wind velocity (v): ");

scanf("%f %f", &t, &v);

wcf = 35.74 + 0.6215 \* t + (0.4275 \* t - 35.75) \* pow(v, 0.16);

printf("Wind-Chill Factor: %f\n", wcf);

return 0;

}

13) If value of an angle is input through the keyboard, write a program

to print all its Trigonometric ratios.

#include <stdio.h>

#include <math.h>

int main() {

float angle;

printf("Enter an angle in degrees: ");

scanf("%f", &angle);

float radian = angle \* (M\_PI / 180);

printf("Sin(%f) = %f\n", angle, sin(radian));

printf("Cos(%f) = %f\n", angle, cos(radian));

printf("Tan(%f) = %f\n", angle, tan(radian));

return 0;

}

14) Two numbers are input through the keyboard into two locations C

and D. Write a program to interchange the contents of C and D.

#include <stdio.h>

int main() {

int C, D, temp;

printf("Enter values for C and D: ");

scanf("%d %d", &C, &D);

temp = C;

C = D;

D = temp;

printf("After interchanging, C = %d and D = %d\n", C, D);

return 0;

}

15)If cost price and selling price of an item is input through the keyboard,

write a program to determine whether the seller has made profit or

incurred loss. Also determine how much profit he made or loss he

incurred.

# include <stdio.h>

int main( )

{

float cp, sp, p, l ;

printf ( "\nEnter cost price and selling price: " ) ;

scanf ( "%f %f", &cp, &sp ) ;

p = sp - cp ;

l = cp - sp ;

if ( p > 0 )

printf ( "The seller made a profit of Rs. %f\n", p ) ;

if ( l > 0 )

printf ( "The seller incurred loss of Rs. %f\n", l ) ;

if ( p == 0 )

printf ( "There is no loss, no profit\n" ) ;

return 0 ;

}  
  
16)Any integer is input through the keyboard. Write a program to find out

whether it is an odd number or even number.

# include <stdio.h>

int main( )

{

int n ;

printf ( "\nEnter any number: " ) ;

scanf ( "%d", &n ) ;

if ( n % 2 == 0 )

printf ( "The number is even\n" ) ;

else

printf ( "The number is odd\n" ) ;

return 0 ;

}

17)Leap Year Rule #1: If the year is evenly divisible by 4, it is a leap year, unless...

Exception Rule #1: If the year is evenly divisible by 100, it is not a leap year, unless...

Exception Rule #2: If the year is evenly divisible by 400, it is a leap year.

So, in summary:

# include <stdio.h>

int main( )

{

int yr ;

printf ( "\nEnter a year: " ) ;

scanf ( "%d", &yr ) ;

if ( yr % 100 == 0 )

{

if ( yr % 400 == 0 )

printf ( "Leap year\n" ) ;

else

printf ( "Not a Leap year\n" ) ;

}

else

{

if ( yr % 4 == 0 )

printf ( "Leap year\n" ) ;

else

printf ( "Not a leap year\n" ) ;

}

return 0 ;

}

18) Write a program to check whether a triangle is valid or not, if three

angles of the triangle are entered through the keyboard. A triangle

is valid if the sum of all the three angles is equal to 180 degrees.

#include <stdio.h>

int main() {

int angle1, angle2, angle3;

printf("Enter three angles of a triangle: ");

scanf("%d %d %d", &angle1, &angle2, &angle3);

if (angle1 + angle2 + angle3 == 180)

printf("Triangle is valid.\n");

else

printf("Triangle is not valid.\n");

return 0;

}

19) Write a program to find the absolute value of a number entered

through the keyboard.

#include <stdio.h>

int main() {

int num;

printf("Enter a number: ");

scanf("%d", &num);

if (num < 0)

num = -num;

printf("Absolute value: %d\n", num);

return 0;

}

20) Given the length and breadth of a rectangle, write a program to find

whether the area of the rectangle is greater than its perimeter. For

example, the area of the rectangle with length = 5 and breadth = 4

is greater than its perimeter.

#include <stdio.h>

int main() {

float length, breadth;

printf("Enter length and breadth of the rectangle: ");

scanf("%f %f", &length, &breadth);

float area = length \* breadth;

float perimeter = 2 \* (length + breadth);

if (area > perimeter)

printf("Area is greater than perimeter.\n");

else

printf("Perimeter is greater than or equal to area.\n");

return 0;

}

21) Given three points (x1, y1), (x2, y2) and (x3, y3), write a program to

check if the three points fall on one straight line.

#include <stdio.h>

int main() {

int x1, y1, x2, y2, x3, y3;

printf("Enter coordinates of three points (x1, y1), (x2, y2), and (x3, y3): ");

scanf("%d %d %d %d %d %d", &x1, &y1, &x2, &y2, &x3, &y3);

if ((y2 - y1) \* (x3 - x2) == (y3 - y2) \* (x2 - x1))

printf("The three points are collinear.\n");

else

printf("The three points are not collinear.\n");

return 0;

}

22) Given the coordinates (x, y) of center of a circle and its radius, write

a program that will determine whether a point lies inside the circle,

on the circle or outside the circle. (Hint: Use sqrt( ) and pow( )

functions)

#include <stdio.h>

#include <math.h>

int main() {

float x, y, cx, cy, radius, distance;

printf("Enter coordinates of the center of the circle (cx, cy): ");

scanf("%f %f", &cx, &cy);

printf("Enter radius of the circle: ");

scanf("%f", &radius);

printf("Enter coordinates of the point (x, y): ");

scanf("%f %f", &x, &y);

distance = sqrt(pow(x - cx, 2) + pow(y - cy, 2));

if (distance < radius)

printf("Point is inside the circle.\n");

else if (distance == radius)

printf("Point is on the circle.\n");

else

printf("Point is outside the circle.\n");

return 0;

}

23) Given a point (x, y), write a program to find out if it lies on X-axis, Yaxis or origin.

#include <stdio.h>

int main() {

int x, y;

printf("Enter coordinates of the point (x, y): ");

scanf("%d %d", &x, &y);

if (x == 0 && y == 0)

printf("Point is at the origin.\n");

else if (x == 0)

printf("Point is on the y-axis.\n");

else if (y == 0)

printf("Point is on the x-axis.\n");

else

printf("Point is neither on the x-axis nor y-axis.\n");

return 0;

}

24) According to Gregorian calendar, it was Monday on the date

01/01/01. If any year is input through the keyboard write a program

to find out what is the day on 1st January of this year.

#include <stdio.h>

int main() {

int year, day;

int baseDay = 1;

int daysInWeek = 7;

char \*days[] = {"Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday", "Sunday"};

printf("Enter a year: ");

scanf("%d", &year);

day = (baseDay + ((year - 2001) \* 365) + ((year - 2001) / 4) - ((year - 2001) / 100) + ((year - 2001) / 400)) % daysInWeek;

printf("January 1st, %d was a %s.\n", year, days[day]);

return 0;

}

25)A year is entered through the keyboard, write a program to determine

whether the year is leap or not. Use the logical operators && and ||.

# include <stdio.h>

int main( )

{

int year ;

printf ( "\nEnter year: " ) ;

scanf ( "%d", &year ) ;

if ( year % 400 == 0 || year % 100 != 0 && year % 4 == 0 )

printf ( "Leap year\n" ) ;

else

printf ( "Not a leap year\n" ) ;

return 0 ;

}

26)If a character is entered through the keyboard, write a program to

determine whether the character is a capital letter, a small case letter, a

digit or a special symbol.

# include <stdio.h>

int main( )

{

char ch ;

printf ( "\nEnter a character from the keyboard: " ) ;

scanf ( "%c", &ch ) ;

if ( ch >= 65 && ch <= 90 )

printf ( "The character is an uppercase letter\n" ) ;

if ( ch >= 97 && ch <= 122 )

printf ( "The character is a lowercase letter\n" ) ;

if ( ch >= 48 && ch <= 57 )

printf ( "The character is a digit\n" ) ;

if ( ( ch >= 0 && ch < 48 ) || ( ch > 57 && ch < 65 )

|| ( ch > 90 && ch < 97 ) || ch > 122 )

printf ( "The character is a special symbol\n" ) ;

return 0 ;

}

27)If the lengths of three sides of a triangle are entered through the

keyboard, write a program to check whether the triangle is valid or not.

The triangle is valid if the sum of two sides is greater than the largest of

the three sides.

scanf ( "%d %d %d", &side1, &side2, &side3 ) ;

if ( side1 > side2 )

{

if ( side1 > side3 )

{

sum = side2 + side3 ; largeside = side1 ;

}

else

{

sum = side1 + side2 ; largeside = side3 ;

}

}

else

{

if ( side2 > side3 )

{

sum = side1 + side3 ; largeside = side2 ;

}

else

{

sum = side1 + side2 ; largeside = side3 ;

}

}

if ( sum > largeside )

printf ( "The triangle is a valid triangle\n" ) ;

else

printf ( "The triangle is an invalid triangle\n" ) ;

return 0 ;

}

28)To find the values of the expressions, let's substitute the given values a = 10, b = 12, and c = 0 into each expression:

a != 6 && b > 5:

The && operator requires both conditions to be true for the whole expression to be true.

So, the result is true.

a == 9 || b < 3:

The || operator requires only one condition to be true for the whole expression to be true.

Since both conditions are false, the result is false.

! (a < 10):

The ! operator negates the result, so the final result is true.

! (a > 5 && c):

The ! operator negates the result, so the final result is true.

5 && c != 8 || !c:

!c is true because c is 0 (!c is equivalent to !0, which is true).

29) If the lengths of three sides of a triangle are entered through the

keyboard, write a program to check whether the triangle is an

isosceles, an equilateral, a scalene or a right-angled triangle.

#include <stdio.h>

int main() {

int side1, side2, side3;

printf("Enter the lengths of three sides of the triangle: ");

scanf("%d %d %d", &side1, &side2, &side3);

if (side1 == side2 && side2 == side3) {

printf("The triangle is an equilateral triangle.\n");

}

else if (side1 == side2 || side2 == side3 || side1 == side3) {

printf("The triangle is an isosceles triangle.\n");

}

else if (side1\*side1 + side2\*side2 == side3\*side3 || side1\*side1 + side3\*side3 == side2\*side2 || side2\*side2 + side3\*side3 == side1\*side1) {

printf("The triangle is a right-angled triangle.\n");

}

else {

printf("The triangle is a scalene triangle.\n");

}

return 0;

}

30) In digital world colors are specified in Red-Green-Blue (RGB) format,

with values of R, G, B varying on an integer scale from 0 to 255. In

print publishing the colors are mentioned in Cyan-Magenta-Yellow-

Black (CMYK) format, with values of C, M, Y, and K varying on a real

scale from 0.0 to 1.0. Write a program that converts RGB color to

CMYK color as per the following formulae:

White Max(Red/255, Green/255, Blue/255)

White-Red/255)

White

Cyan

White-Green/255

Magenta =

White

Yellow

=

White-Blue/255

White

Black = 1-White

Note that if the RGB values are all 0, then the CMY values

are all 0 and the K value is 1.

#include <stdio.h>

int main() {

int red, green, blue;

float cyan, magenta, yellow, black, white;

printf("Enter RGB values (0 to 255): ");

scanf("%d %d %d", &red, &green, &blue);

float red\_norm = red / 255.0;

float green\_norm = green / 255.0;

float blue\_norm = blue / 255.0;

white = fmax(red\_norm, fmax(green\_norm, blue\_norm));

cyan = (white - red\_norm) / white;

magenta = (white - green\_norm) / white;

yellow = (white - blue\_norm) / white;

black = 1 - white;

printf("CMYK values are: C=%.2f, M=%.2f, Y=%.2f, K=%.2f\n", cyan, magenta, yellow, black);

return 0;

}

31) A certain grade of steel is graded according to the following

conditions:

(i) Hardness must be greater than 50

(ii) Carbon content must be less than 0.7

(iii) Tensile strength must be greater than 5600

The grades are as follows:

Grade is 10 if all three conditions are met

Grade is 9 if conditions (i) and (ii) are met

Grade is 8 if conditions (ii) and (iii) are met

Grade is 7 if conditions (i) and (iii) are met

Grade is 6 if only one condition is met

Grade is 5 if none of the conditions are met

Write a program, which will require the user to give values of

hardness, carbon content and tensile strength of the steel under

consideration and output the grade of the steel.

#include <stdio.h>

int main() {

int hardness;

float carbonContent, tensileStrength;

printf("Enter hardness, carbon content, and tensile strength: ");

scanf("%d %f %f", &hardness, &carbonContent, &tensileStrength);

int grade = 5;

if (hardness > 50 && carbonContent < 0.7 && tensileStrength > 5600) {

grade = 10; // All conditions met

} else if (hardness > 50 && carbonContent < 0.7) {

grade = 9; // Conditions (i) and (ii) met

} else if (carbonContent < 0.7 && tensileStrength > 5600) {

grade = 8; // Conditions (ii) and (iii) met

} else if (hardness > 50 && tensileStrength > 5600) {

grade = 7; // Conditions (i) and (iii) met

} else if (hardness > 50 || carbonContent < 0.7 || tensileStrength > 5600) {

grade = 6; // Only one condition met

}

printf("Grade: %d\n", grade);

return 0;

}

32) The Body Mass Index (BMI) is defined as ratio of the weight of a

person (in kilograms) to the square of the height (in meters). Write

a program that receives weight and height, calculates the BMI, and

reports the BMI category as per the following table:

BMI Category BMI

Starvation < 15

Anorexic 15.1 to 17.5

Underweight 17.6 to 18.5

Ideal 18.6 to 24.9

Overweight 25 to 25.9

Obese 30 to 30.9

Morbidly Obese >= 40

#include <stdio.h>

int main() {

float weight, height, bmi;

printf("Enter weight (in kg): ");

scanf("%f", &weight);

printf("Enter height (in meters): ");

scanf("%f", &height);

bmi = weight / (height \* height);

printf("BMI: %.2f\n", bmi);

if (bmi < 15)

printf("BMI Category: Starvation\n");

else if (bmi >= 15.1 && bmi <= 17.5)

printf("BMI Category: Anorexic\n");

else if (bmi >= 17.6 && bmi <= 18.5)

printf("BMI Category: Underweight\n");

else if (bmi >= 18.6 && bmi <= 24.9)

printf("BMI Category: Ideal\n");

else if (bmi >= 25 && bmi <= 25.9)

printf("BMI Category: Overweight\n");

else if (bmi >= 30 && bmi <= 30.9)

printf("BMI Category: Obese\n");

else

printf("BMI Category: Morbidly Obese\n");

return 0;

}

33) Write a program using conditional operators to determine whether

a year entered through the keyboard is a leap year or not.

#include <stdio.h>

int main() {

int year;

printf("Enter a year: ");

scanf("%d", &year);

if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {

printf("%d is a leap year.\n", year);

} else {

printf("%d is not a leap year.\n", year);

}

return 0;

}

34) Write a program to find the greatest of the three numbers entered

through the keyboard. Use conditional operators.

#include <stdio.h>

int main() {

int num1, num2, num3, greatest;

printf("Enter three numbers: ");

scanf("%d %d %d", &num1, &num2, &num3);

greatest = (num1 > num2) ? ((num1 > num3) ? num1 : num3) : ((num2 > num3) ? num2 : num3);

printf("The greatest number is: %d\n", greatest);

return 0;

}

35) Write a program to receive value of an angle in degrees and check

whether sum of squares of sine and cosine of this angle is equal to

#include <stdio.h>

#include <math.h>

int main() {

float angle\_degrees, sum\_of\_squares;

printf("Enter the angle in degrees: ");

scanf("%f", &angle\_degrees);

float angle\_radians = angle\_degrees \* (M\_PI / 180.0);

sum\_of\_squares = pow(sin(angle\_radians), 2) + pow(cos(angle\_radians), 2);

if (sum\_of\_squares == 1) {

printf("The sum of squares of sine and cosine is equal to 1.\n");

} else {

printf("The sum of squares of sine and cosine is not equal to 1.\n");

}

return 0;

}

36) Rewrite the following program using conditional operators.

# include <stdio.h>

int main( )

{

float sal ;

printf ( "Enter the salary" ) ;

scanf ( "%f", &sal ) ;

if ( sal >= 25000 && sal <= 40000 )

printf ( "Manager\n" ) ;

else

if ( sal >= 15000 && sal < 25000 )

printf ( "Accountant\n" ) ;

else

printf ( "Clerk\n" ) ;

return 0 ;

}

#include <stdio.h>

int main() {

float sal;

printf("Enter the salary: ");

scanf("%f", &sal);

printf("%s\n", (sal >= 25000 && sal <= 40000) ? "Manager" :

(sal >= 15000 && sal < 25000) ? "Accountant" : "Clerk");

return 0;

}  
  
37)Write a program to calculate overtime pay of 10 employees. Overtime is

paid at the rate of Rs. 120.00 per hour for every hour worked above 40

hours. Assume that employees do not work for fractional part of an

hour.

# include <stdio.h>

int main( )

{

float otpay ;

int hour, i = 1 ;

while ( i <= 10 )

{

printf ( "\nEnter no. of hours worked: " ) ;

scanf ( "%d", &hour ) ;

if ( hour >= 40 )

otpay = ( hour - 40 ) \* 120 ;

else

otpay = 0 ;

printf ( "Hours = %d Overtime pay = Rs.%f\n", hour, otpay ) ;

i++ ;

}

return 0 ;

}

38)Write a program to find the factorial value of any number entered

through the keyboard.

# include <stdio.h>

int main( )

{

int num, i, fact ;

printf ( "Enter a number: " ) ;

scanf ( "%d", &num ) ;

fact = i = 1 ;

while ( i <= num )

{

fact = fact \* i ;

i++ ;

}

printf ( "Factorial value of %d = %d\n", num, fact ) ;

return 0 ;

}

39)Two numbers are entered through the keyboard. Write a program to

find the value of one number raised to the power of another.

# include <stdio.h>

int main( )

{

float x, power ;

int y, i ;

printf ( "\nEnter two numbers: " ) ;

scanf ( "%f %d", &x, &y ) ;

power = i = 1 ;

while ( i <= y )

{

power = power \* x ;

i++ ;

}

printf ( "%f to the power %d is %f\n", x, y, power ) ;

return 0 ;

}

40) Write a program to print out all Armstrong numbers between 1 and

500. If sum of cubes of each digit of the number is equal to the

number itself, then the number is called an Armstrong number. For

example, 153 = ( 1 \* 1 \* 1 ) + ( 5 \* 5 \* 5 ) + ( 3 \* 3 \* 3 ).

#include <stdio.h>

int main() {

int num, originalNum, remainder, result, n = 0;

printf("Armstrong numbers between 1 and 500 are:\n");

for (num = 1; num <= 500; num++) {

result = 0;

originalNum = num;

while (originalNum != 0) {

originalNum /= 10;

n++;

}

originalNum = num;

while (originalNum != 0) {

remainder = originalNum % 10;

result += pow(remainder, n);

originalNum /= 10;

}

if (result == num) {

printf("%d\n", num);

}

n = 0;

}

return 0;

}  
  
41) Write a program for a matchstick game being played between the

computer and a user. Your program should ensure that the

computer always wins. Rules for the game are as follows:

There are 21 matchsticks.

The computer asks the player to pick 1, 2, 3, or 4 matchsticks.

After the person picks, the computer does its picking.

Whoever is forced to pick up the last matchstick loses the game.

#include <stdio.h>

int main() {

int matchsticks = 21;

while (matchsticks > 1) {

printf("There are %d matchsticks left.\n", matchsticks);

int user\_pick;

do {

printf("Pick 1, 2, 3, or 4 matchsticks: ");

scanf("%d", &user\_pick);

} while (user\_pick < 1 || user\_pick > 4 || user\_pick > matchsticks); // Validate user input

matchsticks -= user\_pick;

int computer\_pick = 5 - user\_pick;

printf("Computer picks %d matchsticks.\n", computer\_pick);

matchsticks -= computer\_pick;

}

printf("You lose! There is 1 matchstick left.\n");

return 0;

}

42) Write a program to enter numbers till the user wants. At the end it

should display the count of positive, negative and zeros entered.

#include <stdio.h>

int main() {

int number, positive\_count = 0, negative\_count = 0, zero\_count = 0;

char choice;

do {

printf("Enter a number (or 'q' to quit): ");

scanf("%d", &number);

if (number > 0) {

positive\_count++;

} else if (number < 0) {

negative\_count++;

} else {

zero\_count++;

}

printf("Do you want to enter another number (y/n)? ");

scanf(" %c", &choice); // Use space before %c to consume newline from previous input

} while (choice == 'y' || choice == 'Y'); // Continue loop if user enters 'y' or 'Y'

printf("\nNumber of positive numbers: %d\n", positive\_count);

printf("Number of negative numbers: %d\n", negative\_count);

printf("Number of zeros: %d\n", zero\_count);

return 0;

}

43) Write a program to receive an integer and find its octal equivalent.

(Hint: To obtain octal equivalent of an integer, divide it continuously

by 8 till dividend doesn’t become zero, then write the remainders

obtained in reverse direction.)

#include <stdio.h>

int main() {

int num, originalNum, remainder;

printf("Enter an integer: ");

scanf("%d", &num);

originalNum = num;

printf("Octal equivalent of %d is: ", num);

do {

remainder = num % 8;

printf("%d", remainder);

num /= 8;

} while (num != 0);

printf("\n");

return 0;

}

44) Write a program to find the range of a set of numbers entered

through the keyboard. Range is the difference between the smallest

and biggest number in the list.

#include <stdio.h>

#include <limits.h>

int main() {

int num, count = 0, smallest = INT\_MAX, largest = INT\_MIN;

printf("Enter numbers (enter 0 to quit):\n");

do {

scanf("%d", &num);

count++;

if (num < smallest && num != 0) {

smallest = num;

}

if (num > largest) {

largest = num;

}

} while (num != 0);

if (count == 1) {

printf("No valid numbers entered.\n");

} else {

int range = largest - smallest;

printf("Range of entered numbers: %d\n", range);

}

return 0;

}  
  
45)Write a program to print all prime numbers from 1 to 300.

#include <stdio.h>

int main() {

int i, n = 1;

printf("\nPrime numbers between 1 and 300 are :\n1\t"); // Print 1 (though technically not prime)

for (n = 1; n <= 300; n++) {

for (i = 2; i < n; i++) {

if (n % i == 0) break;

}

if (i == n) printf("%d\t", n);

}

return 0;

}

46)Write a program to add first seven terms of the following series using a

for loop.

1/1! + 2/2! + 3/3! ……

#include <stdio.h>

int main() {

int i;

float fact = 1.0, sum = 0.0;

for (i = 1; i <= 7; i++) {

fact \*= i; // Calculate factorial efficiently

sum += i / fact;

}

printf("Sum of series = %.6f\n", sum);

return 0;

}

47)Write a program to generate all combinations of 1, 2 and 3 using for loop

#include <stdio.h>

int main() {

int i = 1, j = 1, k = 1;

for (i = 1; i <= 3; i++) {

for (j = 1; j <= 3; j++) {

for (k = 1; k <= 3; k++) {

printf("%d %d %d\n", i, j, k);

}

}

}

return 0;

}

48) Write a program to print the multiplication table of the number

entered by the user. The table should get displayed in the following

form:

29 \* 1 = 29

29 \* 2 = 58

…

#include <stdio.h>

int main() {

int number, i;

printf("Enter a number: ");

scanf("%d", &number);

printf("Multiplication Table of %d:\n", number);

for (i = 1; i <= 10; i++) {

]

printf("%d \* %d = %d\n", number, i, number \* i);

}

return 0;

}

49) According to a study, the approximate level of intelligence of a person can be calculated using the following formula: i = 2 + ( y + 0.5 x )

Write a program that will produce a table of values of i, y and x,where y varies from 1 to 6, and, for each value of y, x varies from

5.5 to 12.5 in steps of 0.5.

#include <stdio.h>

int main() {

float y, x, i;

printf(" y | x | i\n");

printf("-----|------------|--------\n");

for (y = 1; y <= 6; y++) {

for (x = 5.5; x <= 12.5; x += 0.5) {

i = 2 + (y + 0.5 \* x);

printf("%.1f | %.1f | %.1f\n", y, x, i);

}

}

return 0;

}

50) When interest compounds q times per year at an annual rate ofr% for n years, the principal p compounds to an amount a as per

the following formula a = p(1+r/q) nq Write a program to read 10 sets of p, r, n & q and calculate the corresponding as.

#include <stdio.h>

int main() {

int i;

float p, r, n, q, a;

for (i = 1; i <= 10; i++) {

printf("Enter set %d values (p r n q): ", i);

scanf("%f %f %f %f", &p, &r, &n, &q);

float interest\_rate\_per\_period = r / q;

float total\_periods = n \* q;

a = p \* pow(1 + interest\_rate\_per\_period, total\_periods);

printf("Set %d: Amount (a) = %.2f\n", i, a);

}

return 0;

}