| **Practical Number** | 05 |
| --- | --- |
| **Areas covered** | Iteration control structure |

# Section A

Q1) Write a C program to print numbers from 0 to 100. (You are required to write 3 separate answers each using While, Do..While, For, looping structures).

While Loop

#include <stdio.h>

int main(void) {

int i = 0;

while (i <= 100) {

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

i++;

}

return 0;

}

Do While Loop

#include <stdio.h>

int main(void) {

int x=0;

do

{

printf("%d ",x);

x++;

}while(x<=100);

}

For Loop

#include <stdio.h>

int main(void) {

int x;

for (x=0;x<=100;x++)

{

printf("%d ",x);

}

}

Q2) Write a C program to calculate and print the total of 10 marks and the average. If the average is less than 50 program should print “Fail!” otherwise “Pass!”

#include <stdio.h>

int main(void) {

int i = 1, m, tot = 0;

float avg;

while (i <= 10) {

printf("Enter The Marks Of The Subject %d - ", i);

scanf("%d", &m);

tot = tot + m;

i++;

}

avg = tot / 10;

printf("\nThe Total Is %d", tot);

printf("\nThe Average Is %f\n", avg);

if (avg >= 50) {

printf("Pass");

} else {

printf("Fail");

}

return 0;

}

Q3) Write a C program to calculate factorial of a user given number. Hint:

Select an appropriate looping structure. Factorial of ‘0’ is ‘1’ (0! = 1)

Ex: factorial of number 5 is calculated as 5! = 5\*4\*3\*2\*1

#include<stdio.h>

int main()

{

int a,b,fac=1;

printf("Enter A Positive Integer - ");

scanf("%d",&a);

if(a==0)

{

printf("\n0!=1\n");

}

else if(a>0)

{

b=a;

while(b>=2)

{

fac=fac\*b;

b--;

}

printf("\n%d!=%d\n",a,fac);

}

else {printf("\nYou Have Entered A Negative Integer\n");}

}

Q4) Write a C program to calculate the sum of all digits of a user given number.

If user input 123 your program should output 6. (calculated as 1+2+3)

#include <stdio.h>

int main()

{

int a, b = 0, c;

printf("Enter A Number - ");

scanf("%d", &a);

c = a;

while (a != 0) {

b = b + a % 10;

a = a / 10;

}

printf("\nThe Sum Of The Digits Of The Number %d Is %d\n", c, b);

}

Q5) Write a C program to reverse the digits of a number using *do*-*while* statement.

#include <stdio.h>

int main(void) {

int a,b;

printf("Enter A Number - ");

scanf("%d",&a);

do{

if(a/10==0){printf("%d",a%10);break;}

else {printf("%d",a%10);a=a/10;}}

while(a%10>=0);

return 0;

}

Q6) Write a C program to calculate nth power of a given integer. The user input base and exponent. (Do NOT use inbuilt functions, instead use a loop)

#include <stdio.h>

#include <stdlib.h>

int main() {

int a, b, d, e = 1;

double c = 1.00;

printf("Enter The Base - ");

scanf("%d", &a);

printf("Enter The Exponent - ");

scanf("%d", &b);

d = b;

if (d > 0) {

while (d >= 1) {

e = e \* a;

d--;

}

printf("%d To Power Of %d Is Equals To %d", a, b, e);

} else if (d < 0) {

while (abs(d) >= 1) {

c = c / (double)a;

d++;

}

printf("%d To Power Of %d Is Equals To %f", a, b, c);

} else {

printf("%d To Power Of 0 Is Equals To 1", a);

}

}

Q7) Write a C program to print first 10 numbers of “Fibonacci Sequence”.

#include <stdio.h>

int main() {

int a = 1,b=1,c=1,d;

printf("This Is The Fibonnaci Sequence Upto 10 Numbers\n0\n1\n1\n");

while(a<=7){d=b+c;b=c;c=d;a++;printf("%d\n",d);}

}

Q8) Write a C program to check whether a given number is an Armstrong Number! (Refer to previous flowcharts)

int main()

{

int a, b = 0, c = 1, d=0,e=0,f,g,h;

printf("Enter A Number - ");

scanf("%d", &a);

f=a;g=a;

if (a == 0) {b = 0;}

else {while (f / 10 > 0) {b++;f = f / 10;}}

h=b+1;

while (g > 0) {d=g%10;while(h>=1){c=d\*c;h--;}g = g / 10;e=e+c;h=b+1;c=1;}

if(e==a){printf("%d Is A Armstrong Number",a);}

else {printf("%d Is Not A Armstrong Number",a);}

}

Q9) Write a C program to print all the ASCII values for letters A to Z.

#include <stdio.h>

int main()

{

char a;

printf("Enter A Capital Letter - ");

scanf("%s", &a);

if(a!='A' && a!='B' && a!='C' && a!='D' && a!='E' && a!='F' && a!='G' && a!='H' && a!='I' && a!='J' && a!='K' && a!='L' && a!='M' && a!='N' && a!='O' && a!='P' && a!='Q' && a!='R' && a!='S' && a!='T' && a!='U' && a!='V' && a!='W' && a!='X' && a!='Y' && a!='Z'){printf("You Should Enter A Capital Letter");}

else {printf("The ASCII Code Of %c Is ",a);

while(a=='A'){printf("065");break;}

while(a=='B'){printf("066");break;}

while(a=='C'){printf("067");break;}

while(a=='D'){printf("068");break;}

while(a=='E'){printf("069");break;}

while(a=='F'){printf("070");break;}

while(a=='G'){printf("071");break;}

while(a=='H'){printf("072");break;}

while(a=='I'){printf("073");break;}

while(a=='J'){printf("074");break;}

while(a=='K'){printf("075");break;}

while(a=='L'){printf("076");break;}

while(a=='M'){printf("077");break;}

while(a=='N'){printf("078");break;}

while(a=='O'){printf("079");break;}

while(a=='P'){printf("080");break;}

while(a=='Q'){printf("081");break;}

while(a=='R'){printf("082");break;}

while(a=='S'){printf("083");break;}

while(a=='T'){printf("084");break;}

while(a=='U'){printf("085");break;}

while(a=='V'){printf("086");break;}

while(a=='W'){printf("087");break;}

while(a=='X'){printf("088");break;}

while(a=='Y'){printf("089");break;}

while(a=='Z'){printf("090");break;}}}

Q10) Write a program to print this pattern.

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#include <stdio.h>

int main() {

int i = 1;

while (i <= 5) {

int j = 1;

while (j <= i) {

printf("\*");

j++;

}

printf("\n");

i++;

}

}

Q11) Write a program to check whether a given number is prime or not.

#include <stdio.h>

int main() {

int a, b = 1, c = 0, d = -1;

printf("Enter A Number - ");

scanf("%d", &a);

if (a == 0) {

printf("0 Is Neither A Prime Number Nor A Composite Number");

} else if (a > 0) {

while (b <= a) {

if (a % b == 0) {

c++;

}

b++;

}

if (a % 1 == 0 && a % a == 0 && c == 2) {

printf("%d Is A Prime Number", a);

} else {

printf("%d Is A Composite Number", a);

}

} else {

while (d >= a) {

if (a % d == 0) {

c++;

}

d--;

}

if (a % 1 == 0 && a % a == 0 && c == 2) {

printf("%d Is A Prime Number", a);

} else {

printf("%d Is A Composite Number", a);

}

}

}

Q12) Write a C program to print all factors of a given integer.

#include <stdio.h>

#include <stdlib.h>

int main() {

int a, b = 1, c = -1;

printf("Enter A Number - ");

scanf("%d", &a);

if(a>0){

printf("Factors Of %d\n", a);

while (b <= a) {if (a % b == 0) {printf("%d\n", b);}b++;}

while (c >= -a) {if (a % c == 0) {printf("%d\n", c);}c--;}}

else if(a<0){

printf("Factors Of %d\n", a);

while (b <= -a) {if (a % b == 0) {printf("%d\n", b);}b++;}

while (c >= a) {if (a % c == 0) {printf("%d\n", c);}c--;}}

else {printf("O Has No Factors\n");}

}

Q13) Write a C program to add all user inputs until user input ‘-1’. And then display the sum.

#include <stdio.h>

int main() {

int a = 0, b = -1,c=0;

while (a < b || a > b) {

printf("Enter A Number - ");

scanf("%d", &a);

c=c+a;

}

printf("The Sum Of The All User Inputs Is %d",c+1);

}

Q14) Write a C program to read user inputs for an integer array (size = 10) and print the array.

#include <stdio.h>

int main(void)

{

int i,arr[10];

for(i=0;i<10;i++)

{

printf("Enter A Value To The Element %d - ",i+1);

scanf("%d",&arr[i]);

}

printf("\n");

printf("The Array Is - ");

for(i=0;i<10;i++)

{printf("%d ",arr[i]);}

}

Q15) Re-Write the above code to count all the even numbers in above integer array and display the count.

#include <stdio.h>

int main(void)

{

int i, arr[10],ec=0;

for (i = 0; i < 10; i++)

{

printf("Enter A Value To The Element %d - ", i + 1);

scanf("%d", &arr[i]);

}

printf("\n");

printf("The Array Is - ");

for (i = 0; i < 10; i++)

{

printf("%d ", arr[i]);

if(arr[i]%2==0){ec++;}

}

printf("\nThere Are %d Even Numbers In The Array\n",ec);

}

# Section B

1. Input 10 numbers and to output number of positive, number of negative, number of zeros.

#include <stdio.h>

int main() {

int a = 1,b,c=0,d=0,e=0;

while (a <= 10) {

printf("Enter A Number %d - ",a);

scanf("%d", &b);

if(b>0){c++;}

else if(b<0){d++;}

else{e++;}

a++;

}

printf("\nThere Are %d Positive Numbers\n",c);

printf("There Are %d Negative Numbers\n",d);

printf("There Are %d Zeroes\n",e);

}

1. Input Marks of 10 students and output the maximum , minimum and average Marks.

#include <stdio.h>

int main() {

int a = 1, b, c = 0, d = 100, e = 0;

float f;

while (a <= 10) {

printf("Enter Marks Of Student %d - ", a);

scanf("%d", &b);

e = e + b;

if (b > c) {c = b;}

if (b < d) {d = b;}

a++;

}

f = (float)e / 10;

printf("\nThe Maximum Is %d\n", c);

printf("\nThe Minimum Is %d\n", d);

printf("\nThe Average Is %f\n", f);

}

1. Input price of 10 items and display the average value of an Item , number of items which the price is greater than 200.

#include <stdio.h>

int main() {

int a = 1, b, c = 0,d = 0;

float e;

while (a <= 10) {

printf("Enter Price Of Item %d - ", a);

scanf("%d", &b);

d = d + b;

if (b > 200) {c++;}

a++;}

e = (float)d / 10;

printf("\nThere Are %d Items Which Has A Price Greater Than 200\n", c);

printf("\nThe Average Is %f\n", e);

}

1. Input the Employee no and the Basic Salary of the Employees in an organisation ending with the dummy value -999 for Employee no and count the number Employees whose Basic Salary

>=5000.

#include <stdio.h>

int main()

{

int a =1, b, c=1,d=0,e=0,f;

printf("To End The Program Please Enter The Employee Number As -999\n");

while(c==1)

{

printf("\nEnter Employee Number - ");

scanf("%d", &a);

if (a != -999)

{

printf("Enter The Basic Salary - ");

scanf("%d", &b);

c=1;

if(b<0){printf("\nBasic Salary Cannot Be Negative\n");}

else {printf("\nEmployee Number - %d\n",a);printf("Basic Salary - Rs.%d\n",b);}

if(b>=5000){d++;}}

if(a==-999)

{c=0;printf("\nThere Are %d Employees Whose Basic Salary Is >=5000\nThe Program Ends Here.\n",d);}}}

1. Input employee number, and hours worked by employees, and to display the following:

Employee number, Over Time Payment, and the percentage of employees whose Over Time Payment exceeding the Rs. 4000/-.

The user should input –999 as employee number to end the program, and the normal Over Time Rate is Rs.150 per hour and Rs. 200 per hour for hours in excess of 40.

#include <stdio.h>

int main() {

int a =1, b, c=1,d,e=0,f=0,g;

char h='%';

printf("To End The Program Please Enter The Employee Number As -999\n");

while(c==1){

printf("\nEnter Employee Number - ");

scanf("%d", &a);

if (a != -999) {

printf("Enter The Number Of Hours Worked - ");

scanf("%d", &b);

c=1;

f++;

if(b<0){printf("\nThe Number Of Hours Cannot Be Negative\n");}

else {if(b>40){d=b\*200-40\*50;}

else{d=b\*150;}

printf("\nEmployee Number - %d\n",a);

printf("Overtime Payment - Rs.%d\n",d);}

if(d>4000){e++;}

}

if(a==-999){c=0;g=(e\*100)/f;printf("\nThere Are %d %c Employees Whose Overtime Payment Exceeds Rs.4000. \nThe Program Ends Here.",g,h);}

}}