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MCA_B_13_Vishal

C Programs:

C Program List: [From C_Programs_List.pdf]

```c
// 1. Write a program to print “Hello World” message.
#include<stdio.h>
#include<conio.h>
int main(){
   clrscr();
   printf("Hello World!");
   getch();
   return 0;
}
```

Output:

```
Hello World!
```

```c
// 2. Write a program to print Name, Address and Birth Date.
#include<stdio.h>
#include<conio.h>
int main() {
   clrscr();

   printf("\n\tName \t\t: Vishal");
   printf("\n\tAddress \t: Dwarka - 361306");
   printf("\n\tBirth Date \t: 18/12/2002");

   getch();
   return 0;
}
```

Output:

```
        Name            : Vishal
        Address         : Dwarka - 361306
        Birth Date      : 18/12/2002
```

```c
// 3. Write a program to add, multiply and divide two integers and float numbers.
#include<stdio.h>
#include<conio.h>

int main() {
   int a, b;
   float c, d;
   clrscr();
```

```
    //a = 10;
    //b = 20;
    //c = 30.30f;
    //d = 40.40f;

    printf("\n\tEnter first integer number : ");
    scanf("%d", &a);
    printf("\n\tEnter second integer number : ");
    scanf("%d", &b);

    printf("\n\tFor Integer Number\n");
    printf("\n\t%d + %d = %d", a, b, a + b);
    printf("\n\t%d - %d = %d", a, b, a - b);
    printf("\n\t%d * %d = %d", a, b, a * b);
    printf("\n\t%d / %d = %d", a, b, a / b);

    printf("\n\n\tEnter first float number : ");
    scanf("%f", &c);
    printf("\n\tEnter second float number : ");
    scanf("%f", &d);

    printf("\n\n\tFor Floting Number\n");
    printf("\n\t%f + %f = %f", c, d, c + d);
    printf("\n\t%f - %f = %f", c, d, c - d);
    printf("\n\t%f * %f = %f", c, d, c * d);
    printf("\n\t%f / %f = %f", c, d, c / d);

    getch();
    return 0;
}
```

Output:

```
        Enter first integer number : 12

        Enter second integer number : 10

        For Integer Number

        12 + 10 = 22
        12 - 10 = 2
        12 * 10 = 120
        12 / 10 = 1

        Enter first float number : 12.10

        Enter second float number : 12.12


        For Floting Number

        12.100000 + 12.120000 = 24.220000
        12.100000 - 12.120000 = -0.020000
        12.100000 * 12.120000 = 146.652003
```

```
        12.100000 / 12.120000 = 0.998350

// 4. Write a program to find area of a rectangle.(Area=l*b)
#include<stdio.h>
#include<conio.h>

int main() {
   float l, b, area;
   clrscr();

   printf("\n\tEnter length of reactangle : ");
   scanf("%f", &l);
   printf("\n\tEnter breadth of reactangle : ");
   scanf("%f", &b);

   area = l * b;

   printf("\n\n\tArea of Rectangle : %.2f", area);

   getch();
   return 0;
}
```

Output:

```
        Enter length of reactangle : 12

        Enter breadth of reactangle : 13


        Area of Rectangle : 156.00
```

```
// 5. Write a program to find volume of cube.(Area=l*b*h)
#include<stdio.h>
#include<conio.h>

int main() {
   float l, b, h, area;
   clrscr();

   printf("\n\tEnter length of cude : ");
   scanf("%f", &l);
   printf("\n\tEnter breadth of cude : ");
   scanf("%f", &b);
   printf("\n\tEnter height of cude : ");
   scanf("%f", &h);

   area = l * b * h;

   printf("\n\n\tarea of cube is : %.2f", area);

   getch();
   return 0;
}
```

Output:

```
        Enter length of cude : 12
```

```
        Enter breadth of cude : 23

        Enter height of cude : 21


        area of cube is : 5796.00
```

```
// 6. Write a program to find area of triangle.(Area=(l*b)/2)
#include<stdio.h>
#include<conio.h>

int main() {
   float l, b, area;

   clrscr();

   printf("\n\tEnter length of triangle : ");
   scanf("%f", &l);
   printf("\n\tEnter breadth of triangle : ");
   scanf("%f", &b);

   area = (l * b) / 2.0;

   printf("\n\tarea of triangle is : %.2f", area);

   getch();
   return 0;
}
```

Output:

```
        Enter length of triangle : 12

        Enter breadth of triangle : 10

        area of triangle is : 60.00
```

```
// 7. Write a program in C to convert the given temperature from Fahrenheit to Celsius
using the formula C = (F – 32) / 1.8
#include<stdio.h>
#include<conio.h>

int main() {
   float f, c;
   clrscr();

   printf("\n\tEnter tempereture in fahrenhit : ");
   scanf("%f", &f);

   c = (f - 32) / 1.8;

   printf("\n\tTempereture in Celsius is %.2f", c);

   getch();
   return 0;
```

```
}
```
Output:
```
        Enter tempereture in fahrenhit : 152

        Tempereture in Celsius is 66.67
```
```
// 8. Write a program convert temperature from Celsius to Fahrenheit where temperature
in Celsius is entered by user.(C = 5/9 (f – 32))
#include<stdio.h>
#include<conio.h>

int main() {
   float f, c;
   clrscr();

   printf("\n\tEnter tempereture in celsius : ");
   scanf("%f", &c);

   f = (c * 9 / 5) + 32;

   printf("\n\tTempereture in Fahrenheit is %.2f", f);

   getch();
   return 0;
}
```
Output:
```
        Enter tempereture in celsius : 35

        Tempereture in Fahrenheit is 95.00
```
```
// 9. Write a program to calculate area of circle.(pi*r*r)
#include<stdio.h>
#include<conio.h>
#define PI 3.14

int main() {
   float r, area;
   clrscr();

   printf("Enter circle radius : ");
   scanf("%f", &r);

   area = PI * r * r;

   printf("circle area is : %.2f", area);

   getch();
   return 0;
}
```
Output:
```
Enter circle radius : 12
circle area is : 452.16

// 10. Write a program in C to find the Circumference of a circle.(2*pi*r)
#include<stdio.h>
```

```c
#include<conio.h>
#define PI 3.14

int main() {
   float r, area;
   clrscr();

   printf("Enter circle radius : ");
   scanf("%f", &r);

   area = PI * r * 2;

   printf("circumference circle is : %.2f", area);

   getch();
   return 0;
}
```

Output:

```
Enter circle radius : 12
circumference circle is : 75.36
```

```c
// 11. Write a program in C to calculate simple interest using formula SI = (P*R*N) /
100.
#include<stdio.h>
#include<conio.h>

int main() {
   float p, r, si;
   int n;
   clrscr();

   printf("\n\tEnter principal amount : ");
   scanf("%f", &p);
   printf("\n\tEnter rate of interest per year : ");
   scanf("%f", &r);
   printf("\n\tEnter time period in years : ");
   scanf("%d", &n);

   si = (p * r * n) / 100;

   printf("\n\tsimple interest is : %.2f", si);

   getch();
   return 0;
}
```

Output:

```
        Enter principal amount : 12300

        Enter rate of interest per year : 123

        Enter time period in years : 45

        simple interest is : 680805.00
```

```c
// 12. Write a program in C to display sum from 1 to N using the formula N(N+1)/2.
#include<stdio.h>
#include<conio.h>
long int nsum(long int);
int main() {
   long int n;
   clrscr();

   printf("\n\tEnter nth number: ");
   scanf("%ld", &n);
   printf("\n\t Sum of 1 to %ld number is %ld", n, nsum(n));
   getch();
   return 0;
}
long int nsum(long int n) {
   return n * (n + 1) / 2;
}
```

Output:

```
        Enter nth number: 12

         Sum of 1 to 12 number is 78
```

```c
// 13. Write a program that reads the radius of sphere “r”, then it calculates its
volume “V” and surface area “A” using formulas. (pi*r*r*4)/3
#include<stdio.h>
#include<conio.h>
#define PI 3.14

float volume(float);
float area(float);

int main() {
   float r;
   clrscr();

   printf("\n\tEnter Radius or Sphere: ");
   scanf("%f", &r);

   printf("\n\tVolume of Sphere is %.2f", volume(r));
   printf("\n\tArea of Sphere is %.2f", area(r));

   getch();
   return 0;
}

float volume(float r) {
   return (4 / 3) * PI * r * r * r;
}
float area(float r) {
   return 4 * PI * r * r;
}
```

Output:

```
        Enter Radius or Sphere: 12
```

```
        Volume of Sphere is 5425.92
        Area of Sphere is 1808.64

// 14. Write a C program to obtain an hourly pay rate and the number of hours worked by
workers. Calculate their pay for the week.
#include<stdio.h>
#include<conio.h>

long payForWeek(int, int);

int main() {
   int rate, time;
   clrscr();

   printf("\n\tEnter Hourly pay rate: ");
   scanf("%d", &rate);
   printf("\n\tEnter number of hours: ");
   scanf("%d", &time);

   printf("\n\tPay for the week is %ld", payForWeek(rate, time));

   getch();
   return 0;
}
long payForWeek(int rate, int time) {
   return 7 * rate * time;
}
```

Output:

```
        Enter Hourly pay rate: 12

        Enter number of hours: 10

        Pay for the week is 840

// 15. Write a C program to find out the area of right angle triangle using formula
area = ½ * base * height.
#include<stdio.h>
#include<conio.h>

float area(float, float);

int main() {
   float base, height;
   clrscr();

   printf("\n\tEnter base of right angle triangle: ");
   scanf("%f", &base);
   printf("\n\tEnter height of right angle triangle: ");
   scanf("%f", &height);

   printf("\n\tArea of right angle triangle is %.2f", area(base, height));

   getch();
   return 0;
```

```
}
float area(float base, float height) {
   return (1.5 * base * height);
}
```

Output:

```
        Enter base of right angle triangle: 12

        Enter height of right angle triangle: 15

        Area of right angle triangle is 270.00
```

```
// 16. Write a C program to find out compound interest using following formula Compound Interest = P * ( 1 + r / 100 ) n - P.
#include<stdio.h>
#include<conio.h>
#include<math.h>

float interest(long, int, int);

int main() {
   int r, n;
   long p;
   clrscr();

   printf("\n\tEnter Principal amount: ");
   scanf("%ld", &p);
   printf("\n\tEnter rate of interest: ");
   scanf("%d", &r);
   printf("\n\tEnter time per year: ");
   scanf("%d", &n);

   printf("\n\tCompound interest is %.2f", interest(p, r, n));

   getch();
   return 0;
}
float interest(long p, int r, int n) {
   float a = p * pow((1 + r / 100.0), n);
   //printf("%f", a);
   return a - p;
}
```

Output:

```
        Enter Principal amount: 1200

        Enter rate of interest: 5

        Enter time per year: 12

        Compound interest is 955.03
```

```
// 17. Write a C program to read a floating point number from user and then display the right most digit of the integral part of the number.
#include<stdio.h>
```

```c
#include<conio.h>

int main() {
   float n;
   clrscr();

   printf("\n\tEnter floting number: ");
   scanf("%f", &n);

   printf("\n\tIngeral part is %d", (int)n);

   getch();
   return 0;
}
```

Output:

```
        Enter floting number: 12.123

        Ingeral part is 12
```

```c
// 18. Write a C program to read the distance between two cities in KM. and print that
distance in meters, feet, inches and centimeters.
#include<stdio.h>
#include<conio.h>

float kmtom(float);
float kmtoft(float);
float kmtoin(float);
float kmtocm(float);

int main() {
   float km;
   clrscr();

   printf("\n\tEnter distance between two cities in km: ");
   scanf("%f", &km);

   printf("\n\t%.2f km = %.2f meters", km, kmtom(km));
   printf("\n\t%.2f km = %.2f feet", km, kmtoft(km));
   printf("\n\t%.2f km = %.2f inches", km, kmtoin(km));
   printf("\n\t%.2f km = %.2f centimeters", km, kmtocm(km));

   getch();
   return 0;
}
float kmtom(float km) { return (1000 * km); }
float kmtocm(float km) { return (100000 * km); }
float kmtoft(float km) { return (3280.84 * km); }
float kmtoin(float km) { return (39370.1 * km); }
```

Output:

```
        Enter distance between two cities in km: 45

        45.00 km = 45000.00 meters
        45.00 km = 147637.80 feet
        45.00 km = 1771654.50 inches
```

```
        45.00 km = 4500000.00 centimeters

// 19. Write a C program to convert angle in degrees to radians using formula angle in
radians = (angle in degrees * ∏) / 180.
#include<stdio.h>
#include<conio.h>
#define PI 3.14

float dtor(float);

int main() {
   float d;
   clrscr();

   printf("\n\tEnter degrees: ");
   scanf("%f", &d);

   printf("\n\t%.2f degrees = %.2f radians", d, dtor(d));

   getch();
   return 0;
}
float dtor(float d) {
   return (d * PI) / 180.0;
}
Output:
        Enter degrees: 12

        12.00 degrees = 0.21 radians

/* 20. Write a program to accept number of days and print year, month and remaining
days. */
#include<stdio.h>
#include<conio.h>

void day_to_year_month(int);
int main() {
   int n = 0;
   // clrscr();
   printf("\n\tEnter number of days: ");
   scanf("%d", &n);

   day_to_year_month(n);
   // getch();
   return 0;
}
void day_to_year_month(int n) {
   int y, m;
   if (n >= 356) {
      y = n / 365;
      n = n % 365;
      printf("\n\t %d Year", y);
   }
   if (n >= 30) {
```

```
      m = n / 30;
      n = n % 30;
      printf("\n\t %d Month", m);
   }
   printf("\n\t %d Remaining days", n);
}
```

Output:

```
        Enter number of days: 400

         1 Year
         1 Month
         5 Remaining days
```

```
/* 21. Write a C program to read a price of an item in (float) like 10.25 and print
output in(int) paisa like1025. */
#include<stdio.h>
#include<conio.h>
#include<string.h>

int remove_point(float);
int paisa(float);

int main() {
   float n = 0;
   // clrscr();
   printf("\n\tEnter floating point number: ");
   scanf("%f", &n);

   printf("\n\tAnswer: %d", paisa(n));
   printf("\n\tAnswer: %d", remove_point(n)); // perfect work in only after point 6
digit if enter more digit than that not showing
   // getch();
   return 0;
}

int paisa(float n) {
   return n * 100;
}

int remove_point(float n) {
   char str[100];
   int a, c = 0, i = 0;
   float b;
   sprintf(str, "%f", n); // convert float to string, after point not 6 digit than add
0 it self
   printf("\n%s", str);
   while (str[i] != '\0') {
      if (str[i] >= '0' && str[i] <= '9') {
         a = n;
         b = n - a;
         n = b * 10;
         c = (c * 10) + a;
      }
      i++;
```

```
    }
    return c;
}
```

Output:

```
        Enter floating point number: 10.25

        Answer: 1025
10.250000
        Answer: 102500000
```

```
/* 22. Write a C program to read number and display in the form of Hour, Min and
Seconds. */
#include <stdio.h>
#include <conio.h>

int main() {
    int ts, m, h, s;
    // clrscr();
    printf("\n\tSeconds to minits and hours");
    printf("\n\tEnter seconds: ");
    scanf("%d", &ts);

    s = ts;
    h = s / 3600;
    s = s % 3600;
    m = s / 60;
    s = s % 60;
    printf("\n\t%d Seconds = %d Hour : %d Minits : %d Seconds", ts, h, m, s);

    // getch();
    return 0;
}
```

Output:

```
        Seconds to minits and hours
        Enter seconds: 18240

        18240 Seconds = 5 Hour : 4 Minits : 0 Seconds
```

```
/* 23. Write a program to Find out Maximum number among two numbers. */
#include<stdio.h>
#include<conio.h>
int find_max(int, int);
int main() {
    int n1, n2;
    // clrscr();
    printf("\n\tEnter number 1: ");
    scanf("%d", &n1);
    printf("\n\tEnter number 2: ");
    scanf("%d", &n2);

    printf("\n\tMaximum value is: %d", find_max(n1, n2));
    // getch();
    return 0;
}
```

```
int find_max(int a, int b) {
   if (a > b)
      return a;
   else
      return b;
}
```

Output:

```
        Enter number 1: 1

        Enter number 2: 3

        Maximum value is: 3
```

```
/* 24. Write a program to Check whether given number is positive, negative or zero. */
#include<stdio.h>
#include<conio.h>

int main() {
   int n;
   // clrscr();
   printf("\n\tEnter number: ");
   scanf("%d", &n);

   if (n > 0) {
      printf("\n\t Number is positive");
   }
   else if (n < 0) {
      printf("\n\t Number is negative");
   }
   else {
      printf("\n\t Number is size");
   }
   // getch();
   return 0;
}
```

Output:

```
        Enter number: -2

         Number is negative
```

```
/* 25. Write a program to arrange any three numbers in ascending order. */
#include<stdio.h>
#include<conio.h>

int main() {
   int n1, n2, n3;
   // clrscr();
   printf("\n\tEnter number (ex. 1 2 3): ");
   scanf("%d %d %d", &n1, &n2, &n3);

   if (n1 < n2) {
      if (n2 < n3) {
         printf("\n\t Ascending order: %d %d %d", n1, n2, n3);
```

```
      }
      else if (n1 < n3) {
         printf("\n\t Ascending order: %d %d %d", n1, n3, n2);
      }
      else {
         printf("\n\t Ascending order: %d %d %d", n3, n1, n2);
      }
   }
   else {
      if (n1 < n3) {
         printf("\n\t Ascending order: %d %d %d", n2, n1, n3);
      }
      else if (n2 < n3) {
         printf("\n\t Ascending order: %d %d %d", n2, n3, n1);
      }
      else {
         printf("\n\t Ascending order: %d %d %d", n3, n2, n1);
      }
   }
   // getch();
   return 0;
}
```

Output:

```
        Enter number (ex. 1 2 3): 1 4 2

         Ascending order: 1 2 4
```

```
/* 26. Write a program to Find out given year which is leap or not. */
#include<stdio.h>
#include<conio.h>

int isLeapYear(int);

int main() {
   int year;
   // clrscr();
   printf("\n\tEnter year: ");
   scanf("%d", &year);

   if (isLeapYear(year)) {
      printf("\n\t%d is a leap year.", year);
   }
   else {
      printf("\n\t%d is not a leap year.", year);
   }
   // getch();
   return 0;
}
int isLeapYear(int year) {
   return (year % 4 == 0 && year % 100 != 0) || (year % 400 == 0);
}
```

Output:

```
        Enter year: 2025
```

```
        2025 is not a leap year.

/* 27. Write a program in C to enter any arithmetic operator (+ - * /) and two integer
values
and display result according to selection of operator. */
#include<stdio.h>
#include<conio.h>

int main() {
   int n1, n2;
   char op;
   float result;
   // clrscr();
   printf("\n\tEnter number 1: ");
   scanf("%d", &n1);
   printf("\n\tEnter number 2: ");
   scanf("%d", &n2);
   printf("\n\tEnter operator (+ - * /): ");
   scanf(" %c", &op);

   switch (op) {
   case '+':   printf("\n\tResult: %.2f", n1 + n2);   break;
   case '-':   printf("\n\tResult: %.2f", n1 - n2);   break;
   case '*':   printf("\n\tResult: %.2f", n1 * n2);   break;
   case '/': {
      if (n2 != 0) {
         printf("\n\tResult: %.2f", n1 / n2);
      }
      else {
         printf("\n\tDivision by zero is not allowed.");
      }
      break;
   }
   default:    printf("\n\tInvalid operator.");
   }
   // getch();
   return 0;
}
```

Output:

```
        Enter number 1: 12

        Enter number 2: 18

        Enter operator (+ - * /): +

        Result: 30.00

/* 28. Write a program that read a number from 1 TO 7 and then print corresponding day
name from the week using switch-case. */
#include<stdio.h>
#include<conio.h>

void dayName(int day);
```

```c
int main() {
   int day;
   // clrscr();
   printf("\n\tEnter day number (1 to 7): ");
   scanf("%d", &day);

   dayName(day);

   // getch();
   return 0;
}

void dayName(int day) {
   switch (day) {
   case 1:  printf("\n\tDay is Sunday");  break;
   case 2:  printf("\n\tDay is Monday");  break;
   case 3:  printf("\n\tDay is Tuesday"); break;
   case 4:  printf("\n\tDay is Wednesday");  break;
   case 5:  printf("\n\tDay is Thursday");   break;
   case 6:  printf("\n\tDay is Friday");  break;
   case 7:  printf("\n\tDay is Saturday");   break;
   default: printf("\n\tInvalid day number. Please enter a number between 1 and 7.");
   }
}
```

Output:

```
        Enter day number (1 to 7): 5

        Day is Thursday
```

```c
/* 29. Write a program to enter 4 digit numbers from user and display it in string.
e.g.  Input : 1234
output : One Two Three Four. */
#include<stdio.h>
#include<conio.h>
#include<math.h>

void printDigitInWords(int);

int main() {
   int num;
   // clrscr();
   printf("\n\tEnter a 4-digit number: ");
   scanf("%d", &num);

   printDigitInWords(num);

   // getch();
   return 0;
}

void printDigitInWords(int num) {
   int rem, reverse = 0;
   while (num > 0) {
      rem = num % 10;
```

```
      reverse = reverse * 10 + rem;
      num = num / 10;
   }

   printf("\n\tNumber in words: ");
   while (reverse > 0) {
      rem = reverse % 10;
      switch (rem) {
      case 0: printf("Zero "); break;
      case 1: printf("One "); break;
      case 2: printf("Two "); break;
      case 3: printf("Three "); break;
      case 4: printf("Four "); break;
      case 5: printf("Five "); break;
      case 6: printf("Six "); break;
      case 7: printf("Seven "); break;
      case 8: printf("Eight "); break;
      case 9: printf("Nine "); break;
      }
      reverse = reverse / 10;
   }
}
```

Output:

```
        Enter a 4-digit number: 1432

        Number in words: One Four Three Two
```

```
/* 30. Write a program in C to calculate gross salary of employee using :
1. Gross Salary = Basic Pay + DA + HRA – PF.
2. DA = 30% If Basic Pay < 5000 otherwise DA = 45% of the Basic Pay.
3. HRA = 15% of Basic Pay.
4. PF = 12% of Basic Pay.
*/
#include<stdio.h>
#include<conio.h>
int main() {
   float basicPay, grossSalary, DA, HRA, PF;
   clrscr();
   printf("\n\tEnter Basic Pay of Employee: ");
   scanf("%f", &basicPay);
   if (basicPay < 5000) {
      DA = 0.30 * basicPay;
   }
   else {
      DA = 0.45 * basicPay;
   }
   HRA = 0.15 * basicPay;
   PF = 0.12 * basicPay;
   grossSalary = basicPay + DA + HRA - PF;
   printf("\n\tGross Salary of Employee is: %.2f", grossSalary);
   getch();
   return 0;
}
```

Output:

```
        Enter Basic Pay of Employee: 1500

        Gross Salary of Employee is: 1995.00

/* 31. Write a program to check eligibility of student for admission.
Student should fulfill the following criteria for admission :
Mathematics >= 50, Physics >= 45, Chemistry >= 60, Total of all subject >= 170
OR Total of Mathematics + Physics >= 120
Accept the marks of all the three subjects from the user and check if the student is
eligible for admission.
Print the message : Student is eligible for Admission
                                  OR
                  Student is not eligible for admission */
#include<stdio.h>
#include<conio.h>
int main() {
   int math, phy, chem, total;
   clrscr();
   printf("\n\tEnter marks of Mathematics: ");
   scanf("%d", &math);
   printf("\n\tEnter marks of Physics: ");
   scanf("%d", &phy);
   printf("\n\tEnter marks of Chemistry: ");
   scanf("%d", &chem);
   total = math + phy + chem;
   if ((math >= 50 && phy >= 45 && chem >= 60 && total >= 170) || (math + phy >= 120)) {
      printf("\n\tStudent is eligible for Admission");
   }
   else {
      printf("\n\tStudent is not eligible for admission");
   }
   getch();
   return 0;
}
```

Output:

```
        Enter marks of Mathematics: 85

        Enter marks of Physics: 76

        Enter marks of Chemistry: 67

        Student is eligible for Admission

/* 32. Write a program to read marks from keyboard and your program should display
equivalent grade according to following table.
====================
  Marks      Grade
====================
  0-34       Fail
  35-59       Second Class
  60-79       First Class
  80-59       Dist*/
#include<stdio.h>
```

```c
#include<conio.h>
int main() {
   int marks;
   clrscr();
   printf("\n\tEnter marks of student: ");
   scanf("%d", &marks);
   if (marks >= 0 && marks <= 34) {
      printf("\n\tGrade is : Fail");
   }
   else if (marks >= 35 && marks <= 59) {
      printf("\n\tGrade is : Second Class");
   }
   else if (marks >= 60 && marks <= 79) {
      printf("\n\tGrade is : First Class");
   }
   else if (marks >= 80 && marks <= 100) {
      printf("\n\tGrade is : Dist");
   }
   else {
      printf("\n\tInvalid Marks");
   }
   getch();
   return 0;
}
```

Output:

```
        Enter marks of student: 76

        Grade is : First Class
```

```c
/* 33. A manufacturing company classified its executives into 4 levels for the benefit of
certain perks. The levels and corresponding perks are shown below:
Levels Perks
      Conveyance Allowance Entertainment Allowance
1        1000                 500
2        750                  200
3        500                  100
4        250                  0
Income tax is deducted from the salary on a percentage basis as follows.
Gross Salary   Tax Rate
Gross <= 2000  No Deduction
2000 to 4000   3%
4000 to 5000   5%
Gross > 5000   8%
Write a program that will read an executive's job number, level number and basic pay
and then compute the net salary after withholding (deducting) Income tax.
Gross Salary = Basic + HRA + Perks ( HRA = 10% of Basic)
Net Salary = Gross Salary – Income Tax */
#include<stdio.h>
#include<conio.h>
int main() {
   int no, level;
   float bp, hra, perk, grossSalary, incomeTax = 0, netSalary;
   clrscr();
   printf("\n\tEnter Executive Job Number: ");
```

```
    scanf("%d", &no);
    printf("\n\tEnter Executive Level (1-4): ");
    scanf("%d", &level);
    printf("\n\tEnter Executive Basic Pay: ");
    scanf("%f", &bp);
    hra = 0.10 * bp;
    switch (level) {
    case 1:
       perk = 1000 + 500;
       break;
    case 2:
       perk = 750 + 200;
       break;
    case 3:
       perk = 500 + 100;
       break;
    case 4:
       perk = 250 + 0;
       break;
    default:
       printf("\n\tInvalid Level Number");
    }
    grossSalary = bp + hra + perk;
    if (grossSalary <= 2000) {
       incomeTax = 0;
    }
    else if (grossSalary > 2000 && grossSalary <= 4000) {
       incomeTax = 0.03 * grossSalary;
    }
    else if (grossSalary > 4000 && grossSalary <= 5000) {
       incomeTax = 0.05 * grossSalary;
    }
    else if (grossSalary > 5000) {
       incomeTax = 0.08 * grossSalary;
    }
    netSalary = grossSalary - incomeTax;
    printf("\n\tExecutive Net Salary is: %.2f", netSalary);
    getch();
    return 0;
}
```

Output:

```
        Enter Executive Job Number: 2

        Enter Executive Level (1-4): 3

        Enter Executive Basic Pay: 4500

        Executive Net Salary is: 5106.00
```

```
/* 34. An Electric power Distribution Company charges its consumers
Consumption Unit        Rate of Charges
For First 50 Units         Rs 2.30
Next 50 Units              Rs 2.60
Next 150 Units             Rs 3.25
More than 300 Units        Rs 4.35
```

```c
Write a program to take no of units consumed from user and calculate the bill
Amount.*/
#include<stdio.h>
#include<conio.h>
int main() {
   int units;
   float amount = 0.0;
   clrscr();
   printf("\n\tEnter number of units consumed: ");
   scanf("%d", &units);
   if (units <= 50) {
      amount = units * 2.30;
   }
   else if (units > 50 && units <= 100) {
      amount = (50 * 2.30) + ((units - 50) * 2.60);
   }
   else if (units > 100 && units <= 250) {
      amount = (50 * 2.30) + (50 * 2.60) + ((units - 100) * 3.25);
   }
   else if (units > 250) {
      amount = (50 * 2.30) + (50 * 2.60) + (150 * 3.25) + ((units - 250) * 4.35);
   }
   printf("\n\tElectricity Bill Amount is: %.2f", amount);
   getch();
   return 0;
}
```

Output:

```
        Enter number of units consumed: 150

        Electricity Bill Amount is: 407.50
```

```c
/* 35. Write a program in C for grade calculation using if...else if ladder and switch
statement.
Accept marks of 3 subjects, calculate total and based on it calculate grade.
Total greater or equal to than 80                    Grade A+
Total greater or equal to than 70 and less than 80   Grade A
Total greater or equal to than 60 and less than 70   Grade A-
Total greater or equal to than 50 and less than 60   Grade B+*/
#include<stdio.h>
#include<conio.h>
int main() {
   int m1, m2, m3, total, avg;
   char grade[2];
   clrscr();
   printf("\n\tEnter marks of subject 1: ");
   scanf("%d", &m1);
   printf("\n\tEnter marks of subject 2: ");
   scanf("%d", &m2);
   printf("\n\tEnter marks of subject 3: ");
   scanf("%d", &m3);
   total = m1 + m2 + m3;
   avg = total / 3;
   if (avg >= 80 && avg <= 100) {
      grade[0] = 'A';
```

```
      grade[1] = '+';
   }
   else if (avg >= 70 && avg < 80) {
      grade[0] = 'A';
      grade[1] = '\0';
   }
   else if (avg >= 60 && avg < 70) {
      grade[0] = 'A';
      grade[1] = '-';
   }
   else if (avg >= 50 && avg < 60) {
      grade[0] = 'B';
      grade[1] = '+';
   }
   else if (avg >= 0 && avg < 50) {
      grade[0] = 'F';
      grade[1] = '\0';
   }
   else {
      printf("\n\tInvalid Marks");
   }
   printf("\n\tTotal Marks = %d", total);
   printf("\n\tGrade = %c%c", grade[0], grade[1]);
   getch();
   return 0;
}
```

Output:

```
        Enter marks of subject 1: 75

        Enter marks of subject 2: 64

        Enter marks of subject 3: 15

        Total Marks = 154
        Grade = B+
```

```
/* 36. Write a program in C to display a sum of first N even numbers.*/
#include<stdio.h>
#include<conio.h>
int main() {
   int n, i, sum = 0;
   clrscr();
   printf("\n\tEnter value of N: ");
   scanf("%d", &n);
   // for (i = 1;i <= n;i++) {
   //    sum = sum + (2 * i); //
   // }
   sum = n * (n + 1); // Formula of sum of first N even numbers
   printf("\n\tSum of first %d even numbers is: %d", n, sum);
   getch();
   return 0;
}
```

Output:

```
        Enter value of N: 3
```

```
        Sum of first 3 even numbers is: 12

/* 37. Write a program in C to find out factorial of a given number.*/
#include<stdio.h>
#include<conio.h>
int main() {
   long n, fact = 1;
   clrscr();
   printf("\n\tEnter a number to find factorial: ");
   scanf("%d", &n);
   while (n > 0) {
      fact = fact * n;
      n--;
   }
   printf("\n\tFactorial is: %ld", fact);
   getch();
   return 0;
}
```

Output:

```
        Enter a number to find factorial: 5

        Factorial is: 120

/* 38. Write a program in C to display a sum from 1 to given number
1) Using formula n(n+1)/2.
2) Without using Formula. */
#include<stdio.h>
#include<conio.h>
int without_formula(int);
int with_formula(int);
int main() {
   int n, sum1, sum2;
   clrscr();
   printf("\n\tEnter a number: ");
   scanf("%d", &n);
   sum1 = without_formula(n);
   sum2 = with_formula(n);
   printf("\n\tSum from 1 to %d without formula is: %d", n, sum1);
   printf("\n\tSum from 1 to %d with formula is: %d", n, sum2);
   getch();
   return 0;
}
int without_formula(int n) {
   int i, sum = 0;
   for (i = 1;i <= n;i++) {
      sum = sum + i;
   }
   return sum;
}
int with_formula(int n) {
   return (n * (n + 1)) / 2;
}
```

Output:

```
        Enter a number: 5

        Sum from 1 to 5 without formula is: 15
        Sum from 1 to 5 with formula is: 15
```

```c
/* 39. Write a program to Print multiplication table of given number entered by user.*/
#include<stdio.h>
#include<conio.h>
int main() {
   int n, i;
   clrscr();
   printf("\n\tEnter a number to print its multiplication table: ");
   scanf("%d", &n);
   printf("\n\tMultiplication Table of %d is:\n", n);
   for (i = 1;i <= 10;i++) {
      printf("\n\t%d x %d = %d", n, i, n * i);
   }
   getch();
   return 0;
}
```

Output:

```
        Enter a number to print its multiplication table: 55

        Multiplication Table of 55 is:

        55 x 1 = 55
        55 x 2 = 110
        55 x 3 = 165
        55 x 4 = 220
        55 x 5 = 275
        55 x 6 = 330
        55 x 7 = 385
        55 x 8 = 440
        55 x 9 = 495
        55 x 10 = 550
```

```c
/* 40. Write a program to check whether the given number is prime or not.*/
#include<stdio.h>
#include<conio.h>
int isPrime(int);
int main() {
   int n;
   clrscr();
   printf("\n\tEnter a number to check prime or not: ");
   scanf("%d", &n);
   if (isPrime(n)) {
      printf("\n\t%d is a Prime number.", n);
   }
   else {
      printf("\n\t%d is not a Prime number.", n);
   }
   getch();
   return 0;
}
```

```c
int isPrime(int n) {
   int i;
   if (n <= 1) {
      return 0;
   }
   for (i = 2;i <= n / 2;i++) {
      if (n % i == 0) {
         return 0;
      }
   }
   return 1;
}
```

Output:

```
       Enter a number to check prime or not: 73

       73 is a Prime number.
```

```c
/* 41. Write a program to accept numbers from the user till their sum exceeds 50 */
#include<stdio.h>
#include<conio.h>

void exceed50();

int main() {
   //clrscr();

   exceed50();

   //getch();
   return 0;
}

void exceed50() {
   int n, sum = 0;
   do {
      printf("\n\tEnter number: ");
      scanf("%d", &n);
      sum = sum + n;
   } while (sum <= 50);
   printf("\n\tYou are exceeds sum of 50!");
}
```

Output:

```
        Enter number: 12

        Enter number: 10

        Enter number: 8

        Enter number: 4

        Enter number: 34

        You are exceeds sum of 50!
```

```c
/* 42. Print first 50 odd numbers. Note that program should display only five numbers
per line. */
#include<stdio.h>
#include<conio.h>

void first50Odd();

int main() {
   //clrscr();

   first50Odd();

   //getch();
   return 0;
}

void first50Odd() {
   int i = 1, c = 0, v = 4;
   while (c < 50) {
      if (i % 2 != 0) {
         printf("\t%d", i);
         if (v == 0) {
            printf("\n");
            v = 5;
         }
         v--;
         c++;
      }
      i++;
   }
}
```

Output:

```
        1       3       5       7       9
        11      13      15      17      19
        21      23      25      27      29
        31      33      35      37      39
        41      43      45      47      49
        51      53      55      57      59
        61      63      65      67      69
        71      73      75      77      79
        81      83      85      87      89
        91      93      95      97      99
```

```c
/*43. Write a C program to read 4-digit number and print the sum of first and last
digit of the number.*/
#include<stdio.h>
#include<conio.h>

int firstAndLastSum(int);

int main() {
   int n, sum;
   //clrscr();
```

```c
    printf("\n\tEnter number: ");
    scanf("%d", &n);
    printf("\n\tFirst and last sum is %d", firstAndLastSum(n));

    //getch();
    return 0;
}

int firstAndLastSum(int n) {
    int sum = 0, rem;
    rem = n % 10; // first
    sum = rem;
    while (n > 0) {
        rem = n % 10; // last
        n = n / 10;
    }
    sum = sum + rem;
    return sum;
}
```

Output:

```
        Enter number: 1234

        First and last sum is 5
```

```c
/* 44. Write a program to find sum of all digits of given number. */
#include<stdio.h>
#include<conio.h>

int digitSum(int);

int main() {
    int n, sum;
    //clrscr();

    printf("\n\tEnter number: ");
    scanf("%d", &n);
    printf("\n\tSum of Digits is %d", digitSum(n));

    //getch();
    return 0;
}

int digitSum(int n) {
    int sum = 0, rem;
    while (n > 0) {
        rem = n % 10;
        sum = sum + rem;
        n = n / 10;
    }
    return sum;
}
```

Output:

```
        Enter number: 154
```

```
        Sum of Digits is 10

/* 45. Write a program to find reverse of a given number. */
#include<stdio.h>
#include<conio.h>

int reverse(int);

int main() {
   int n, sum;
   //clrscr();

   printf("\n\tEnter number: ");
   scanf("%d", &n);
   printf("\n\tit's Reverse number is %d", reverse(n));

   //getch();
   return 0;
}

int reverse(int n) {
   int rem, rev = 0;
   while (n > 0) {
      rem = n % 10;
      rev = rem + (rev * 10);
      n = n / 10;
   }
   return rev;
}
```

Output:

```
        Enter number: 1534

        it's Reverse number is 4351

/* 46. Write a C Program for frequency count for following number.
E.g. 12,12,4,6,6,6,7,7,5
Output is: The frequency of 12 is 2
                            4 is 1
                            5 is 1
                            6 is 3
                            7 is 2*/
#include<stdio.h>
#include<conio.h>
#define MAX 100
int main() {
   int arr[MAX], freq[MAX];
   int n, i, j, count;
   clrscr();
   printf("\n\tEnter number of elements: ");
   scanf("%d", &n);
   for (i = 0;i < n;i++) {
      printf("\tEnter %d elements: ", n);
      scanf("%d", &arr[i]);
      freq[i] = -1;
```

```
   }
   for (i = 0;i < n;i++) {
      count = 1;
      for (j = i + 1;j < n;j++) {
         if (arr[i] == arr[j]) {
            count++;
            freq[j] = 0;
         }
      }
      if (freq[i] != 0) {
         freq[i] = count;
      }
   }
   printf("\n\tFrequency of elements:\n");
   for (i = 0;i < n;i++) {
      if (freq[i] != 0) {
         printf("\n\tThe frequency of %d is %d", arr[i], freq[i]);
      }
   }
   getch();
   return 0;
}
```

Output:

```
        Enter number of elements: 10
        Enter 10 elements: 10
        Enter 10 elements: 10
        Enter 10 elements: 8
        Enter 10 elements: 8
        Enter 10 elements: 8
        Enter 10 elements: 2
        Enter 10 elements: 1
        Enter 10 elements: 2
        Enter 10 elements: 2
        Enter 10 elements: 1

        Frequency of elements:

        The frequency of 10 is 2
        The frequency of 8 is 3
        The frequency of 2 is 3
        The frequency of 1 is 2
```

```
/* 47. Write a program to find out and print all prime numbers lying between 1 to 200.
*/
#include<stdio.h>
#include<conio.h>

int prime(int);
void prime200();

int main() {
   //clrscr();

   // 1 == prime(14) ? printf("Yes") : printf("No"); // check it's prime number ?
```

```
   prime200();

   //getch();
   return 0;
}

int prime(int n) {
   int i = 2, p = 1;
   while (i <= n / 2) {
      if (n % i == 0) {
         p = 0;
      }
      i++;
   }
   return p;
}
void prime200() {
   int i = 2;

   while (i < 200) {
      if (1 == prime(i)) {
         printf("\t%d", i);
      }
      i++;
   }
}
```

Output:

```
        2       3       5       7       11      13      17      19      23      29
31      37      41      43      47      53      59      61      67      7173      79
83      89      97      101     103     107     109     113     127     131     137
139     149     151     157     163     167     173     179       181     191     193
197     199
```

```
/* 48 To check whether the given number is valid binary or not. */
#include<stdio.h>
#include<conio.h>

int isBinary(long int);
int main() {
   long int binary;
   //clrscr();

   printf("\n\tEnter Binary number: ");
   scanf("%ld", &binary);

   1 == isBinary(binary) ? printf("\n\tYes, %ld is valid binary", binary) :
printf("\n\tNo, %ld is not valid binary", binary);

   //getch();
   return 0;
}

int isBinary(long int binary) {
   int flag = 1, rem;
```

```
   while (binary > 0) {
      rem = binary % 10;
      if (rem == 0 || rem == 1)
         flag = 1;
      else
         flag = 0;

      if (flag == 0)
         return flag;

      binary = binary / 10;
   }
   return flag;
}
```

Output:

```
        Enter Binary number: 10110001

        Yes, 10110001 is valid binary
```

```
/* 49 To check whether the given number is valid Octal or not. */
#include<stdio.h>
#include<conio.h>

int isOctal(long int);
int main() {
   long int octal;
   //clrscr();

   printf("\n\tEnter Octal number: ");
   scanf("%ld", &octal);

   1 == isOctal(octal) ? printf("\n\tYes, %ld is valid octal", octal) : printf("\n\tNo,
%ld is not valid octal", octal);

   //getch();
   return 0;
}

int isOctal(long int octal) {
   int flag = 1, rem;
   while (octal > 0) {
      rem = octal % 10;
      if (rem >= 0 && rem <= 7)
         flag = 1;
      else
         flag = 0;

      if (flag == 0)
         return flag;

      octal = octal / 10;
   }
   return flag;
}
```

Output:

```
        Enter Octal number: 172

        Yes, 172 is valid octal
```

```c
/* 50. Write a program generate Sum of two binary numbers. */
#include<stdio.h>
#include<conio.h>

int binaryToDecimal(long);
long decimalToBinary(int);

int main() {
   long b1, b2;
   //clrscr();
   printf("\n\tEnter Decimal number: ");
   scanf("%ld", &b1);
   printf("\n\tEnter Decimal number: ");
   scanf("%ld", &b2);
   printf("\n\t%ld + %ld = %ld", b1, b2, decimalToBinary(binaryToDecimal(b1) +
binaryToDecimal(b2)));
   //getch();
   return 0;
}

int binaryToDecimal(long binary) {
   int decimal = 0, placeValue = 1, binary_base = 2, last_digit;

   while (binary > 0) {
      last_digit = binary % 10;
      binary /= 10;
      decimal += last_digit * placeValue;
      placeValue *= binary_base;
   }

   return decimal;
}
long decimalToBinary(int decimal) {
   long binary = 0, placeValue = 1, decimal_base = 10, last_digit;

   while (decimal > 0) {
      last_digit = decimal % 2;
      decimal /= 2;
      binary += last_digit * placeValue;
      placeValue *= decimal_base;
   }

   return binary;
}
```

Output:

```
        Enter Decimal number: 182
```

```
        Enter Decimal number: 182

        182 + 182 = 101100
```

```
/* 51. To check whether the giver number is palindrome or not. */
#include<stdio.h>
#include<conio.h>

int reverse(int);

int main() {
   int n;
   //clrscr();
   printf("\n\t\t\tcheck is palindrome\n");
   printf("\n\tEnter number: ");
   scanf("%d", &n); // ex. 121, 1221, 12321, 5445,...

   n == reverse(n) ? printf("\n\tYes, This is palindrome number") : printf("\n\tNo,
This is not palindrome number");
   //getch();
   return 0;
}

int reverse(int n) {
   int rem, rev = 0;
   while (n > 0) {
      rem = n % 10;
      rev = rem + (rev * 10);
      n = n / 10;
   }
   return rev;
}
```

Output:

```
                        check is palindrome

        Enter number: 121

        Yes, This is palindrome number
```

```
/* 52. Write a program to Check whether number is Armstrong or not. */
#include<stdio.h>
#include<conio.h>
#include<math.h>

int armstrong(int);
int digitCount(int);
int main() {
   int n;
   //clrscr();
   printf("\n\t\t\tCheck Armstrong number\n");
   printf("\n\tEnter number: ");
   scanf("%d", &n); // ex. 153

   // printf("%d", armstrong(n));
```

```
   n == armstrong(n) ? printf("\n\tYes, This is Armstrong number") : printf("\n\tNo,
This is not Armstrong number");

   //getch();
   return 0;
}

int armstrong(int n) {
   int rem, a = 0, c;
   c = digitCount(n);
   while (n > 0) {
      rem = n % 10;
      //printf("rem = %d, \tc = %d, \tpow = %f\n\n", rem, c, (float)pow(rem, c));
      a = a + (pow(rem, c));
      //printf("%d\n", a);
      n = n / 10;
   }
   return a;
}

int digitCount(int n) {
   int c = 0;
   while (n > 0) {
      c++;
      n = n / 10;
   }
   return c;
}
```

Output:

```
        Enter number: 153

        Yes, This is Armstrong number
```

```
/* 53. Write a program to check whether number is krishnamurti or not. */
#include<stdio.h>
#include<conio.h>
#include<math.h>

long krishnamurti(long);
long factorial(long);

int main() {
   long n;
   //clrscr();
   printf("\n\t\t\tCheck Krishnamurti number\n");
   printf("\n\tEnter number: ");
   scanf("%ld", &n); // ex. 145

   // printf("%d", krishnamurti(n));
   n == krishnamurti(n) ? printf("\n\tYes, This is Krishnamurti number") :
printf("\n\tNo, This is not Krishnamurti number");

   //getch();
   return 0;
```

```
}

long krishnamurti(long n) {
   long rem, a = 0;
   // c = digitCount(n);
   while (n > 0) {
      rem = n % 10;
      a = a + (factorial(rem));
      n = n / 10;
   }
   return a;
}

long factorial(long n) {
   long i, fact = 1;
   for (i = n;i > 0;i--)
      fact *= i;
   //printf("\n%ld", fact);
   return fact;
}
```

Output:

```
                        Check Krishnamurti number

        Enter number: 145

        Yes, This is Krishnamurti number
```

```
/* 54. Write a program to convert decimal to binary. */
#include<stdio.h>
#include<conio.h>

long decimalTo(int, int);
void decimalToBinaryBitwise(int);

int main() {
   int n;
   //clrscr();
   printf("\n\tEnter Decimal number: ");
   scanf("%d", &n);

   printf("Decimal = %d", n);
   printf("\nBinary = %ld", decimalTo(n, 2)); // 2 for binary conversion
   //printf("\nOctal = %ld", decimalTo(n, 8)); // 8 for octal conversion
   printf("\nBinaryBitwise = ");
   decimalToBinaryBitwise(n);
   //getch();
   return 0;
}
long decimalTo(int decimal, int binary_base) {// here binary_base change 8 then this
function will convert decimal to octal.
   int binary = 0, placeValue = 1, decimal_base = 10; // if binary to decimal convert
then, this base is 2 and argument base is 10

   while (decimal > 0) {
```

```
      int last_digit = decimal % binary_base;
      decimal /= binary_base;
      binary += last_digit * placeValue;
      placeValue *= decimal_base;
   }

   return binary;
}
void decimalToBinaryBitwise(int n) {
   int i;
   int size = sizeof(n) * 8; // normally 32 bits.
   // printf("size = %d\n", size);

   int flag = 0;

   for (i = size - 1; i >= 0; i--) {
      int bit = (n >> i) & 1; // this line do: right shit remove bit and & (AND)
operator return only that bit.
      // ex. n=5, i=2 then: (101 >> 2) => 1 , 1 & 1 => 1
      // ex. n=8, i=2 then: (1000 >> 2) => 10 & 01 => 00 (previous add any amount of 0
it's okay)
      // printf("i%d", i);
      // printf("b%d\t", bit);

      if (bit == 1 && flag == 0) { // one time condition true then another all time
condition is false
         flag = 1; // Set flag to indicate first 1 has been found
         // printf("%d\t", bit);
      }
      if (flag == 1) { // start printing bits after the first 1 found. because previous
0 are not meaningful in binary representation.
         printf("%d", bit);
      }
   }
}
```

Output:

```
        Enter Decimal number: 182
Decimal = 182
Binary = 10110110
BinaryBitwise = 10110110
```

```
/* 55. Write a program to convert decimal to octal. */
#include<stdio.h>
#include<conio.h>

int decimalToOctal(int);

int main() {
   int decimal;
   //clrscr();
   printf("\n\tEnter Decimal number: ");
   scanf("%d", &decimal);

   printf("\n\t %d Decimal = %d Octal", decimal, decimalToOctal(decimal));
```

```
   //getch();
   return 0;
}

int decimalToOctal(int decimal) {
   int octal = 0, placeValue = 1, lastDigit;

   while (decimal > 0) {
      lastDigit = decimal % 8;
      decimal /= 8;
      octal += lastDigit * placeValue;
      placeValue *= 10;
   }
   return octal;
}
```

Output:

```
        Enter Decimal number: 153289

         153289 Decimal = 453311 Octal
```

```
/* 56. Write a program to convert decimal to hexadecimal.*/
#include<stdio.h>
#include<conio.h>
int main() {
   int decimal, hex[20], i = 0, j;
   clrscr();
   printf("\n\tEnter a decimal number: ");
   scanf("%d", &decimal);
   while (decimal != 0) {
      hex[i] = decimal % 16;
      decimal = decimal / 16;
      i++;
   }
   printf("\n\tHexadecimal representation is: ");
   for (j = i - 1;j >= 0;j--) {
      if (hex[j] < 10) {
         printf("%d", hex[j]);
      }
      else {
         printf("%c", hex[j] - 10 + 'A'); // Convert to A-F for values 10-15
      }
   }
   getch();
   return 0;
}
```

Output:

```
        Enter a decimal number: 1224

        Hexadecimal representation is: 4C8
```

```
/* 57. Write a program to display a table of conversion from Fahrenheit to Celsius.
Fahrenheit
should start with 0 incremented by 20 and maximum value is 160.*/
#include<stdio.h>
```

```c
#include<conio.h>
#define MAX 160
int main() {
   int f;
   float c;
   clrscr();
   printf("\n\tFahrenheit to Celsius Conversion Table");
   printf("\n\tFahrenheit\tCelsius\n");
   for (f = 0;f <= MAX;f = f + 20) {
      c = (5.0 / 9.0) * (f - 32);
      printf("\n\t%d\t\t%.2f", f, c);
   }
   getch();
   return 0;
}
```

Output:

```
        Fahrenheit to Celsius Conversion Table
        Fahrenheit      Celsius

        0               -17.78
        20              -6.67
        40              4.44
        60              15.56
        80              26.67
        100             37.78
        120             48.89
        140             60.00
        160             71.11
```

```c
/* 58. Write a program to print all the numbers and sum of all the integers that are
greater
than 100 and less than 200 and are divisible by 7.*/
#include<stdio.h>
#include<conio.h>
int main() {
   int i, sum = 0;
   clrscr();
   printf("\n\tNumbers between 100 and 200 divisible by 7 are:\n\t");
   for (i = 101;i < 200;i++) {
      if (i % 7 == 0) {
         printf("%d, ", i);
         sum = sum + i;
      }
   }
   printf("\n\tSum of all integers between 100 and 200 divisible by 7 is: %d", sum);
   getch();
   return 0;
}
```

Output:

```
       Numbers between 100 and 200 divisible by 7 are:
        105, 112, 119, 126, 133, 140, 147, 154, 161, 168, 175, 182, 189, 196,
        Sum of all integers between 100 and 200 divisible by 7 is: 2107
```

```c
/* 59 Write a program to accept amount paid as number (integer) and display it in
```

```c
words. (e.g. Rs 1541 in word : One Thousand Five Hundred Fourty One ). Consider user
will enter more than 999 and less than 9999.  */
#include<stdio.h>
#include<conio.h>

void inword(long);
void inword1(long);

int main() {
   long n;
   //clrscr();
   printf("\n\tEnter Number: ");
   scanf("%ld", &n);

   inword(n);
   //getch();
   return 0;
}

void inword(long x) {
   long divid, remainder;
   if (x >= 1 && x <= 19) {
      inword1(x);
   }
   else if (x >= 20 && x <= 99) {
      divid = (x / 10) * 10;
      inword1(divid);

      remainder = x % 10;
      if (remainder > 0) {
         inword1(remainder);
      }
   }
   else if (x >= 100 && x <= 999) {
      divid = x / 100;
      inword1(divid);
      printf(" hundred");

      remainder = x % 100;
      if (remainder > 0) {
         inword(remainder);
      }
   }
   else if (x >= 1000 && x <= 99999) {
      divid = x / 1000;

      inword(divid);
      printf(" thousand");

      remainder = x % 1000;
      if (remainder > 0) {
         inword(remainder);
      }
   }
```

```
    else if (x >= 100000 && x <= 9999999) {
        divid = x / 100000;
        inword(divid);
        printf(" lakh");

        remainder = x % 100000;
        if (remainder > 0) {
            inword(remainder);
        }
    }
    else if (x >= 10000000 && x <= 999999999) {
        divid = x / 10000000;
        inword1(divid);
        printf(" crore");

        remainder = x % 10000000;
        if (remainder > 0) {
            inword(remainder);
        }
    }
    else if (x >= 1000000000 && x <= 99999999999) {
        divid = x / 1000000000;
        inword1(divid);
        printf(" arab");

        remainder = x % 1000000000;
        if (remainder > 0) {
            inword(remainder);
        }
    }
    else {
        printf("invalid number");
    }
}
void inword1(long x) {
    switch (x) {
    case 1:  printf(" one"); break;
    case 2:  printf(" two"); break;
    case 3:  printf(" three"); break;
    case 4:  printf(" four"); break;
    case 5:  printf(" five"); break;
    case 6:  printf(" six"); break;
    case 7:  printf(" seven"); break;
    case 8:  printf(" eight"); break;
    case 9:  printf(" nine"); break;
    case 10: printf(" ten"); break;
    case 11: printf(" eleven"); break;
    case 12: printf(" twelve"); break;
    case 13: printf(" thirteen"); break;
    case 14: printf(" fourteen"); break;
    case 15: printf(" fifteen"); break;
    case 16: printf(" sixteen"); break;
    case 17: printf(" seventeen"); break;
    case 18: printf(" eighteen"); break;
```

```
   case 19: printf(" nineteen"); break;
   case 20: printf(" twenty"); break;
   case 30: printf(" thirty"); break;
   case 40: printf(" forty"); break;
   case 50: printf(" fifty"); break;
   case 60: printf(" sixty"); break;
   case 70: printf(" seventy"); break;
   case 80: printf(" eighty"); break;
   case 90: printf(" ninety"); break;
   default: printf("invalid"); break;
   }
}
```

Output:

```
        Enter Number: 1432
 one thousand four hundred thirty two
```

```
/* 60. Write a program to find greatest common divisor [GCD] for two positive integer
numbers. */
#include<stdio.h>
#include<conio.h>
int gcd(int, int);
int main() {
   int num1, num2, result;
   clrscr();
   printf("\n\tEnter two positive integers: ");
   scanf("%d %d", &num1, &num2);
   if (num1 <= 0 || num2 <= 0) {
      printf("\n\tPlease enter positive integers only.");
   }
   else {
      result = gcd(num1, num2);
      printf("\n\tGCD of %d and %d is: %d", num1, num2, result);
   }
   getch();
   return 0;
}
int gcd(int a, int b) {
   int temp;
   while (b != 0) {
      temp = b;
      b = a % b;
      a = temp;
   }
   return a;
}
```

Output:

```
        Enter two positive integers: 12 18

        GCD of 12 and 18 is: 6
```

```
/* 61. Write a program to find least common multiplier [LCM] for two positive integers. */
#include<stdio.h>
#include<conio.h>
```

```c
int lcm(int, int);
int main() {
   int num1, num2, result;
   clrscr();
   printf("\n\tEnter two positive integers: ");
   scanf("%d %d", &num1, &num2);
   if (num1 <= 0 || num2 <= 0) {
      printf("\n\tPlease enter positive integers only.");
   }
   else {
      result = lcm(num1, num2);
      printf("\n\tLCM of %d and %d is: %d", num1, num2, result);
   }
   getch();
   return 0;
}
int lcm(int a, int b) {
   int max;
   max = (a > b) ? a : b;
   while (1) {
      if (max % a == 0 && max % b == 0) {
         return max;
      }
      max++;
   }
}
```

Output:

```
        Enter two positive integers: 12 18

        LCM of 12 and 18 is: 36
```

```c
/* 61-94 all patterns */
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>


int menu();

void pp(int);
void px(int);
void p58(int);
void p59(int);
void p60(int);
void p61(int);
void p62(int);
void p63(int);
void p64(int);
void p65(int);
void p66(int);
void p67(int);
void p68(int);
void p69(int);
void p70(int);
```

```
void p71(int);
void p72(int);
void p73(int);
void p74(int);
void p75(int);
void p76(int);
void p77(int);
void p78(int);
void p79(int);
void p80(int);
void p81(int);
void p82(int);
void p83(int);
void p84(int);
void p85(int);
void p86(int);
void p87(int);
void p88(int);
void p89(int);
void p90(int);
void p91(int);
void p92(int);
void p93(int);
void p94(int);

int main() {
   int i, n, x;
   // clrscr();

   do {
      char c = 'C';
      i = menu();

      if (i != 0) {
         printf("\n\tEnter n : ");
         scanf("%d", &n);
      }

      switch (i) {
      case 0: exit(1);
      case 56: pp(n); break;
      case 57: px(n); break;
      case 58: p58(n); break;
      case 59: p59(n); break;
      case 60: p60(n); break;
      case 61: p61(n); break;
      case 62: p62(n); break;
      case 63: p63(n); break;
      case 64: p64(n); break;
      case 65: p65(n); break;
      case 66: p66(n); break;
      case 67: p67(n); break;
      case 68: p68(n); break;
      case 69: p69(n); break;
```

```
      case 70: p70(n); break;
      case 71: p71(n); break;
      case 72: p72(n); break;
      case 73: p73(n); break;
      case 74: p74(n); break;
      case 75: p75(n); break;
      case 76: p76(n); break;
      case 77: p77(n); break;
      case 78: p78(n); break;
      case 79: p79(n); break;
      case 80: p80(n); break;
      case 81: p81(n); break;
      case 82: p82(n); break;
      case 83: p83(n); break;
      case 84: p84(n); break;
      case 85: p85(n); break;
      case 86: p86(n); break;
      case 87: p87(n); break;
      case 88: p88(n); break;
      case 89: p89(n); break;
      case 90: p90(n); break;
      case 91: p91(n); break;
      case 92: p92(n); break;
      case 93: p93(n); break;
      case 94: p94(n); break;
      default: printf("Enter valid number\n"); break;
      }

      printf("\n\n\t\t%continue ? then press enter", c);
      c = getch();
   } while (1);
}

void p58(int n) {
   int i, j;
   char c = 'A';
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         printf("%c\t", c);
         c++;
      }
      printf("\n");
   }
}

void p59(int n) {
   int i, j;
   char c = 'A';
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         if (i % 2 != 0) {
            printf("%d\t", j);
         }
         else {
```

```
            printf("%c\t", c);
            c++;
         }
      }
      c = 'A';
      printf("\n");
   }
}

void p60(int n) {
   int i, j;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         printf("*\t");
      }
      printf("\n");
   }
}

void p61(int n) {
   int i, j;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         printf("%d\t", j);
      }
      printf("\n");
   }
}

void p62(int n) {
   int i, j, v = 1;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         printf("%d\t", v);
         v++;
      }
      printf("\n");
   }
}

void p63(int n) {
   int i, j;
   for (i = 1;i <= n;i++) {
      for (j = i;j <= n;j++) {
         printf(" ");
      }
      for (j = 1;j <= i;j++) {
         printf("*");
      }
      printf("\n");
   }
}

void p64(int n) {
```

```
   int i, j;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= i;j++) {
         printf("*");
      }
      printf("\n");
   }
}

void p65(int n) {
   int i, j;
   for (i = 1;i <= n;i++) {
      for (j = i;j <= n;j++) {
         printf(" ");
      }
      for (j = 1;j <= i;j++) {
         printf("* ");
      }
      printf("\n");
   }
}

void p66(int n) {
   int i, j, v = 1;
   for (i = 1;i <= n;i++) {
      for (j = i;j <= n;j++) {
         printf(" ");
      }
      for (j = 1;j <= i;j++) {
         printf("%d ", v++);
      }
      printf("\n");
      v = 1;
   }
}
void p67(int n) {
   int i, j;
   for (i = 1;i <= n;i++) {
      for (j = i;j <= n;j++) {
         printf(" ");
      }
      for (j = 1;j <= i;j++) {
         printf("%d ", i);
      }
      printf("\n");
   }
}
void p68(int n) {
   int i, j;
   for (i = 0;i < n;i++) {
      for (j = 0;j < i;j++)
         printf(" ");
      for (j = i;j < n;j++)
         printf("%d", n - i);
```

```
      printf("\n");
   }
}
void p69(int n) {
   int i, j;
   for (i = 0;i < n;i++) {
      for (j = 0;j < i;j++)
         printf(" ");
      for (j = i;j < n;j++)
         printf("$");
      printf("\n");
   }
}
void p70(int n) {
   int i, j;
   for (i = 1;i <= n;i++) {
      for (j = i;j <= n;j++) {
         printf(" $");
      }
      printf("\n");
   }
}

void p71(int n) {
   int i, j, v = 1;
   for (i = 1;i < n;i++) {
      for (j = 1;j <= i;j++) {
         printf(" %d", v);
         v++;
      }
      printf("\n");
   }
}

void p72(int n) {
   int i, j;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= i;j++) {
         printf("%d", j);
      }
      printf("\n");
   }
}
void p73(int n) {
   int i, j, v = 1;
   for (i = 1;i <= n;i++) {
      for (j = i;j <= n;j++) {
         printf("   %d", v++);
      }
      printf("\n");
   }
}
void p74(int n) {
   int i, j, v = 1;
```

```
   for (i = 1;i <= n;i++) {
      for (j = i;j <= n;j++) {
         printf(" %d", v++);
      }
      v = 1;
      printf("\n");
   }
}

void p75(int n) {
   int i, j, v = 1;
   for (i = 1; i <= n; i++) {
      for (j = 1; j < i; j++) {
         printf("  ");
      }
      for (j = i; j <= n; j++) {
         printf("%d ", v++);
      }
      printf("\n");
   }
}

void p76(int n) {
   int i, j, v = n * n;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         printf("%d\t", v);
         v--;
      }
      printf("\n");
   }
}
void p77(int n) {
   int i, j, v = 0;
   for (i = 0;i < n;i++)
      for (j = i;j < n;j++)
         v++;
   for (i = 0;i < n;i++) {
      for (j = 0;j < i;j++)
         printf("  ");
      for (j = i;j < n;j++)
         printf(" %d", v--);
      printf("\n");
   }
}
void p78(int n) {
   int i, j, k = (n * 2) - 3;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= i;j++) {
         printf("%d", j);
      }
      for (j = 1;j <= k;j++) {
         printf(" ");
      }
```

```
      k -= 2;
      for (j = i;j > 0;j--) {
         if (j == n) continue;
         printf("%d", j);
      }
      printf("\n");
   }
}
void p79(int n) {
   int i, j;
   char c = 'A';
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= i;j++) {
         if (i % 2 != 0)
            printf(" %d", j);
         else
            printf(" %c", c++);
      }
      printf("\n");
   }
}

void p80(int n) {
   int i, j;
   char c = 'A';
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= i;j++) {
         printf(" %c", c++);
      }
      printf("\n");
      c = 'A';
   }
}

void p81(int n) {
   int i, j, k = 5;
   for (i = 1;i <= (n * 2) - 1;i++) {
      if (i <= n) {
         for (j = i;j <= n;j++) {
            printf(" ");
         }
         for (j = 1;j <= i;j++) {
            printf("* ");
         }
         printf("\n");
      }
      else {
         for (j = 1; j <= i - n;j++) {
            printf(" ");
         }
         for (j = 1;j <= k - 1;j++) {
            printf(" *");
         }
         k--;
```

```
            printf("\n");
         }
      }
   }
   void p82(int n) {
      int i, j, k = 5;
      for (i = 1;i <= (n * 2) - 1;i++) {
         if (i <= n) {
            for (j = i;j <= n;j++) {
               printf(" ");
            }
            for (j = 1;j <= i;j++) {
               if (j == 1 || j == i)
                  printf("* ");
               else
                  printf("  ");
            }
            printf("\n");
         }
         else {
            for (j = 1; j <= i - n;j++) {
               printf(" ");
            }
            for (j = 1;j < k;j++) {
               if (j == 1 || j == k - 1)
                  printf(" *");
               else
                  printf("  ");
            }
            k--;
            printf("\n");
         }
      }
   }

   void p83(int n) {
      int i, j;
      for (i = 1;i <= n;i++) {
         for (j = 1;j <= n;j++) {
            if (i == 1 || i == n)
               printf("*");
            else if (j == 1 || j == n)
               printf("*");
            else
               printf(" ");
         }
         printf("\n");
      }
   }

   void p84(int n) {
      int i, j, k = (n * 2) - 3;
      for (i = 1;i <= n;i++) {
         for (j = 1;j <= i;j++) {
```

```
            printf("*");
         }
         for (j = 0;j <= k;j++) {
            printf(" ");
         }
         k -= 2;
         for (j = i;j > 0;j--) {
            printf("*");
         }
         printf("\n");
      }
   }

   void p85(int n) {
      int i, j, v;
      for (i = 0;i < n;i++) {
         for (j = i;j < n;j++) {
            printf(" ");
         }
         v = 1;
         for (j = 0;j <= i;j++) {
            printf("%d ", v);
            v = v * (i - j) / (j + 1);
         }
         printf("\n");
      }
   }

   void p86(int n) {
      int i, j, v;
      for (i = 0;i < n;i++) {
         for (j = 0;j < i;j++)
            printf(" ");
         v = 97;
         for (j = i;j < n;j++)
            printf("%c ", v++);
         printf("\n");
      }
   }

   void p87(int n) {
      int i, j, v = 1, k = 1;
      for (i = 1;i <= n;i++) {
         for (j = 0;j < i;j++) {
            if (j == 0) {
               v = k;
            }
            if (v == 1) {
               printf("%d", 1);
               v = 0;
            }
            else {
               printf("%d", 0);
               v = 1;
```

```
         }
         if (j == i - 1) {
            if (k == 1)
               k = 0;
            else
               k = 1;
         }
      }
      printf("\n");
   }
}

void p88(int n) {
   int i, j, o = 1;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= i;j++) {
         printf(" %d", o);
         o = o + 2;
      }
      o = 1;
      printf("\n");
   }
}

void p89(int n) {
   int i, j;
   for (i = 0;i < n;i++) {
      for (j = 0;j < i;j++)
         printf("  ");
      for (j = 1;j <= n - i;j++)
         printf(" %d", j * j);
      printf("\n");
   }
}

void p90(int n) {
   int i, j;
   char c = 'A';
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         printf("%c\t", c);
         if (c == 'A')
            c = 'a';
         else
            c = 'A';
      }
      printf("\n");
   }
}

void p91(int n) {
   int i, j;
   char c = 'a';
   for (i = 1;i <= n;i++) {
```

```
      for (j = 1;j <= n;j++) {
         printf("%c\t", c);
         c++;
      }
      printf("\n");
   }
}

void p92(int n) {
   int i, j, v, k;
   for (i = 1;i <= n;i++) {
      for (j = i;j <= n;j++) {
         printf("  ");
      }
      v = i;
      for (j = 1;j <= i;j++) {
         printf(" %d", v--);
      }
      k = 1;
      for (j = 1;j < i;j++) {
         printf(" %d", ++k);
      }
      printf("\n");
   }
}

void p93(int n) {
   int i, j, sp = -1;
   for (i = n;i >= 1;i--) {
      for (j = 1;j <= i;j++) {
         printf(" *");
      }
      for (j = 1;j <= sp;j++) {
         printf("  ");
      }
      sp += 2;
      for (j = i;j >= 1;j--) {
         if (j == n) continue;
         printf(" *");
      }
      printf("\n");
   }
}

void p94(int n) {
   int i, j, sp = -1, a, k = (n * 2) - 3;
   for (i = n;i >= 1;i--) {
      for (j = 1;j <= i;j++) {
         printf(" *");
      }
      for (j = 1;j <= sp;j++) {
         printf("  ");
      }
      sp += 2;
```

```
      for (j = i;j >= 1;j--) {
         if (j == n) continue;
         printf(" *");
      }
      printf("\n");
   }
   for (i = 1;i <= n;i++) {
      if (i == 1) continue;
      for (j = 1;j <= i;j++) {
         printf(" *");
      }
      k -= 2;
      for (j = 1;j <= k;j++) {
         printf("  ");
      }
      for (j = i;j > 0;j--) {
         if (j == n) continue;
         printf(" *");
      }
      printf("\n");
   }
}

void px(int n) {
   int i, j;
   if (n % 2 == 0)
      n++;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         if (i == j || j == n - i + 1)
            printf("*");
         else
            printf(" ");
      }
      printf("\n");
   }
}

void pp(int n) {
   int i, j, m;
   if (n % 2 == 0)
      n++;
   m = (1 + n) / 2;
   for (i = 1;i <= n;i++) {
      for (j = 1;j <= n;j++) {
         if (m == j || m == i)
            printf("+");
         else
            printf(" ");
      }
      printf("\n");
   }
}
```

```
int menu() {
   int i, v = 1, c;
   if (v != 1) {
      printf("\n\tContinue then press enter");
      c = getch();
   }
   v++;
   printf("\n%d%c", v, c);
   printf("\n\t\t\tSeries");
   printf("\n\t 0. Exit\t\t56. pattern + \t\t57. pattern x");
   printf("\n\t 58. pattern 58\t\t59. pattern 59\t\t60. pattern 60");
   printf("\n\t 61. pattern 61\t\t71. pattern 71\t\t81. pattern 81");
   printf("\n\t 62. pattern 62\t\t72. pattern 72\t\t82. pattern 82");
   printf("\n\t 63. pattern 63\t\t73. pattern 73\t\t83. pattern 83");
   printf("\n\t 64. pattern 64\t\t74. pattern 74\t\t84. pattern 84");
   printf("\n\t 65. pattern 65\t\t75. pattern 75\t\t85. pattern 85");
   printf("\n\t 66. pattern 66\t\t76. pattern 76\t\t86. pattern 86");
   printf("\n\t 67. pattern 67\t\t77. pattern 77\t\t87. pattern 87");
   printf("\n\t 68. pattern 68\t\t78. pattern 78\t\t88. pattern 88");
   printf("\n\t 69. pattern 69\t\t79. pattern 79\t\t89. pattern 89");
   printf("\n\t 90. pattern 90\t\t91. pattern 91\t\t92. pattern 92");
   printf("\n\t 93. pattern 93");
   printf("\n\n\tEnter Number: ");
   scanf("%d", &i);
   v++;
   return i;
}
```

Output:

```
2
                        Series
         0. Exit                56. pattern +          57. pattern x
         58. pattern 58         59. pattern 59         60. pattern 60
         61. pattern 61         71. pattern 71         81. pattern 81
         62. pattern 62         72. pattern 72         82. pattern 82
         63. pattern 63         73. pattern 73         83. pattern 83
         64. pattern 64         74. pattern 74         84. pattern 84
         65. pattern 65         75. pattern 75         85. pattern 85
         66. pattern 66         76. pattern 76         86. pattern 86
         67. pattern 67         77. pattern 77         87. pattern 87
         68. pattern 68         78. pattern 78         88. pattern 88
         69. pattern 69         79. pattern 79         89. pattern 89
         90. pattern 90         91. pattern 91         92. pattern 92
         93. pattern 93

        Enter Number: 56

        Enter n : 5
  +
  +
+++++
  +
  +
```

```
                Continue ? then press enter
…[skip writing common part]

        Enter Number: 57

        Enter n : 5
*   *
 * *
  *
 * *
*   *

        Enter Number: 58

        Enter n : 5
A       B       C       D       E
F       G       H       I       J
K       L       M       N       O
P       Q       R       S       T
U       V       W       X       Y

        Enter Number: 59

        Enter n : 5
1       2       3       4       5
A       B       C       D       E
1       2       3       4       5
A       B       C       D       E
1       2       3       4       5

        Enter Number: 60

        Enter n : 5
*       *       *       *       *
*       *       *       *       *
*       *       *       *       *
*       *       *       *       *
*       *       *       *       *

        Enter Number: 61

        Enter n : 5
1       2       3       4       5
1       2       3       4       5
1       2       3       4       5
1       2       3       4       5
1       2       3       4       5

        Enter Number: 62

        Enter n : 5
1       2       3       4       5
6       7       8       9       10
11      12      13      14      15
```

```
16      17      18      19      20
21      22      23      24      25

        Enter Number: 63

        Enter n : 5
     *
    **
   ***
  ****
 *****

        Enter Number: 64

        Enter n : 5
*
**
***
****
*****

        Enter Number: 65

        Enter n : 5
     *
    * *
   * * *
  * * * *
 * * * * *

        Enter Number: 66

        Enter n : 5
      1
     1 2
    1 2 3
   1 2 3 4
  1 2 3 4 5

        Enter Number: 67

        Enter n : 5
     1
    2 2
   3 3 3
  4 4 4 4
 5 5 5 5 5

        Enter Number: 68

        Enter n : 5
55555
 4444
  333
```

```
   22
    1

        Enter Number: 69

        Enter n : 5
$$$$$
 $$$$
  $$$
   $$
    $

        Enter Number: 70

        Enter n : 5
 $ $ $ $ $
 $ $ $ $
 $ $ $
 $ $
 $

        Enter Number: 71

        Enter n : 5
 1
 2 3
 4 5 6
 7 8 9 10

        Enter Number: 72

        Enter n : 5
1
12
123
1234
12345

        Enter Number: 73

        Enter n : 4
   1   2   3   4
   5   6   7
   8   9
   10

        Enter Number: 74

        Enter n : 5
 1 2 3 4 5
 1 2 3 4
 1 2 3
 1 2
 1
```

```
        Enter Number: 75

        Enter n : 4
1 2 3 4
  5 6 7
    8 9
      10

        Enter Number: 76

        Enter n : 5
25      24      23      22      21
20      19      18      17      16
15      14      13      12      11
10      9       8       7       6
5       4       3       2       1
        Enter Number: 77

        Enter n : 4
 10 9 8 7
   6 5 4
     3 2
       1

        Enter Number: 78

        Enter n : 4
1     1
12   21
123 321
1234321

        Enter Number: 79

        Enter n : 5
 1
 A B
 1 2 3
 C D E F
 1 2 3 4 5

        Enter Number: 80

        Enter n : 5
 A
 A B
 A B C
 A B C D
 A B C D E


        Enter Number: 81
```

```
        Enter n : 5
     *
    * *
   * * *
  * * * *
 * * * * *
  * * * *
   * * *
    * *
     *

        Enter Number: 82

        Enter n : 5
     *
    * *
   *   *
  *     *
 *       *
  *     *
   *   *
    * *
     *

        Enter Number: 83

        Enter n : 5
*****
*   *
*   *
*   *
*****

        Enter Number: 84

        Enter n : 4
*      *
**    **
***  ***
********


        Enter Number: 85

        Enter n : 5
    1
   1 1
  1 2 1
 1 3 3 1
1 4 6 4 1

        Enter Number: 86

        Enter n : 5
```

```
a b c d e
 a b c d
  a b c
   a b
    a

        Enter Number: 87

        Enter n : 5
1
01
101
0101
10101

        Enter Number: 88

        Enter n : 5
 1
 1 3
 1 3 5
 1 3 5 7
 1 3 5 7 9

        Enter Number: 89

        Enter n : 5
 1 4 9 16 25
   1 4 9 16
     1 4 9
       1 4
         1

        Enter Number: 90

        Enter n : 5
A       a       A       a       A
a       A       a       A       a
A       a       A       a       A
a       A       a       A       a
A       a       A       a       A

        Enter Number: 91

        Enter n : 5
a       b       c       d       e
f       g       h       i       j
k       l       m       n       o
p       q       r       s       t
u       v       w       x       y

        Enter Number: 92

        Enter n : 5
```

```
          1
        2 1 2
      3 2 1 2 3
    4 3 2 1 2 3 4
  5 4 3 2 1 2 3 4 5

        Enter Number: 93

        Enter n : 5
 * * * * * * * * *
 * * * *   * * * *
 * * *       * * *
 * *           * *
 *               *

        Enter Number: 0


/*
   Find out the Sum of following series
 95. 1+2+3+….+n
 96. 2+4+6+.…+n
 97. 1+3+5+7+….+n
 98. 12 + 22 + 32 + 42 + 52+ ….+n
 99. 22 + 42 + 62 + 82 + ….+n
100. 22 - 42 + 62 - 82 + ……
101. 1^2 +2^2 +3^2 +4^2 ….+n
102. 1 +4 -9 +16 -25 +36 ….+n
103. 1! +2! +3! +4! +….n!
104. 1/1! +1/2! +1/3! +….1/n!
105. 1/22 + 1/42 + 1/62 + 1/82 + ….+n
106. X + X^2/2! + X^3/3! + X^4/4! + ….+n
107. X + X^3/3! + X^5/5! + X^7/7! + ….+n
108. x +x^2 +x^3 +x^4 +….+x^n
109. 1 +2 +4 +8 +16 +32 +….n
110. 1 +1/4 +1/9 +1/16 +….n
111. 1/1^2-1/2^2 +1/3^2-1/4^2 +….n
112. S=x + (x^2/2!) + (x^4/4!) + (x^6/6!) +…. + (x^n/n!)
*/

#include<stdio.h>
#include<conio.h>
#include<math.h>
#include<stdlib.h>

int s95(int);
int s96(int);
int s97(int);
int s98(int);
int s99(int);
int s100(int);
long s101(int);
int s102(int);
long s103(int);
```

```c
float s104(int);
float s105(int);
float s106(int, int);
float s107(int, int);
long s108(int, int);
long s109(int);
float s110(int);
float s111(int);
float s112(int, int);
long fact(int);
int menu();

int main() {
   int n, i, x = 1;
   // clrscr();

   do {
      char c = 'C';
      i = menu();

      if (i != 0 && i < 19) {
         printf("\n\tEnter n numbers value: ");
         scanf("%d", &n);
      }

      switch (i) {
      case 0: exit(1);
      case 1: printf("\tAnswer : %d", s95(n)); break;
      case 2: printf("\tAnswer : %d", s96(n)); break;
      case 3: printf("\tAnswer : %d", s97(n)); break;
      case 4: printf("\tAnswer : %d", s98(n)); break;
      case 5: printf("\tAnswer : %d", s99(n)); break;
      case 6: printf("\tAnswer : %d", s100(n)); break;
      case 7: printf("\tAnswer : %ld", s101(n)); break;
      case 8: printf("\tAnswer : %d", s102(n)); break;
      case 9: printf("\tAnswer : %ld", s103(n)); break;
      case 10: printf("\tAnswer : %.3f", s104(n)); break;
      case 11: printf("\tAnswer : %.4f", s105(n)); break;
      case 12: {
         printf("\tEnter base x value: ");
         scanf("%d", &x);
         printf("\tAnswer : %.3f", s106(n, x));
         break;
      }
      case 13: {
         printf("\tEnter base x value: ");
         scanf("%d", &x);
         printf("\tAnswer : %.3f", s107(n, x));
         break;
      }
      case 14: {
         printf("\tEnter base x value: ");
         scanf("%d", &x);
         printf("\tAnswer : %ld", s108(n, x));
```

```
            break;
         }
         case 15: printf("\tAnswer : %ld", s109(n)); break;
         case 16: printf("\tAnswer : %.3f", s110(n)); break;
         case 17: printf("\tAnswer : %.3f", s111(n)); break;
         case 18: {
            printf("\tEnter base x value: ");
            scanf("%d", &x);
            printf("\tAnswer : %.3f", s112(n, x));
            break;
         }
         default: printf("\t\tPlease enter between 1 to 18 !"); break;
         }
         x = 1;
         printf("\n\t\t Press any key for %continue", c);
         c = getch();
      } while (n != 0);

      getch();
      return 0;
}

int menu() {
      int n;

      printf("\n\n\t----------Find out the Sum of following series----------\n");
      printf("\n\t 0. Exit program");
      printf("\n\t 1. 1 + 2 + 3 + 4 + ... + n");
      printf("\n\t 2. 2 + 4 + 6 + 8 + ... + n");
      printf("\n\t 3. 1 + 3 + 5 + 7 + ... + n");
      printf("\n\t 4. 12 + 22 + 32 + 42 + ... + n");
      printf("\n\t 5. 22 + 42 + 62 + 82 + ... + n");
      printf("\n\t 6. 22 - 42 + 62 - 82 + ... + n");
      printf("\n\t 7. 1^2 + 2^2 + 3^2 + 4^2 + ... + n");
      printf("\n\t 8. 1 + 4 - 9 + 16 - 25 + ... + n");
      printf("\n\t 9. 1! + 2! + 3! + 4! + ... + n"); // here ! is factorian
      printf("\n\t10. 1/1! + 1/2! + 1/3! + 1/4! + ... + n");
      printf("\n\t11. 1/22 + 1/42 + 1/62 + 1/82 + ... + n");
      printf("\n\t12. x + x^2/2! + x^3/3! + x^4/4! + ... + n");
      printf("\n\t13. x + x^3/3! + x^5/5! + x^7/7! + ... + n");
      printf("\n\t14. x + x^2 + x^3 + x^4 + ... + n");
      printf("\n\t15. 1 + 2 4 + 8 + 16 + ... + n");
      printf("\n\t16. 1 + 1/4 + 1/9 + 1/16 + ... + n"); // i*i
      printf("\n\t17. 1/1^2 - 1/2^2 + 1/3^2 - 1/4^2 + ... + n");
      printf("\n\t18. x + x^2/2! + x^4/4! + x^6/6! + ... + n");
      printf("\n\n\tEnter your choice: ");
      scanf("%d", &n);
      return n;
}

int s95(int n) {
      int i, sum = 0;
      for (i = 1;i <= n;i++) {
         sum = sum + i;
```

```
   }
   return sum;
}
int s96(int n) {
   int i, sum = 0;
   for (i = 2;i <= n * 2;i = i + 2) {
      sum = sum + i;
   }
   return sum;
}
int s97(int n) {
   int i, sum = 0;
   for (i = 1;i <= n * 2;i = i + 2) {
      sum = sum + i;
   }
   return sum;
}
int s98(int n) {
   int i, sum = 0, s = 12;
   for (i = 1;i <= n;i++) {
      sum = sum + s;
      s = s + 10;
   }
   return sum;
}
int s99(int n) {
   int i, sum = 0, s = 22;
   for (i = 1;i <= n;i++) {
      sum = sum + s;
      s = s + 20;
   }
   return sum;
}
int s100(int n) {
   int i, sum = 22, s = 42, flag = 0;
   for (i = 2;i <= n;i++) {
      if (flag == 0) {
         sum = sum - s;
         flag = 1;
      }
      else {
         sum = sum + s;
         flag = 0;
      }
      s = s + 20;
   }
   return sum;
}
long s101(int n) {
   int i;
   long sum = 0;
   for (i = 1;i <= n;i++) {
      sum = sum + (i * i);
   }
```

```
   return sum;
}
int s102(int n) {
   int i, sum = 1, flag = 1;
   for (i = 2;i <= n;i++) {
      if (flag == 0) {
         sum = sum - (i * i);
         flag = 1;
      }
      else {
         sum = sum + (i * i);
         flag = 0;
      }
   }
   return sum;
}
long s103(int n) {
   int i;
   long sum = 1, fact = 1;
   for (i = 2;i <= n;i++) {
      fact = fact * i;
      sum = sum + fact;
   }
   return sum;
}
float s104(int n) {
   int i;
   float sum = 1, fact = 1;
   for (i = 2;i <= n;i++) {
      fact = fact * i;
      sum = sum + (1 / fact);
   }
   return sum;
}
float s105(int n) {
   int i;
   float sum = 0, s = 22;
   for (i = 1;i <= n;i++) {
      sum = sum + (1 / s);
      s = s + 20;
   }
   return sum;
}
float s106(int n, int x) {
   int i;
   float sum = 0, fact = 1;
   for (i = 1;i <= n;i++) {
      fact = fact * i;
      sum = sum + (pow(x, i) / fact);
   }
   return sum;
}
float s107(int n, int x) {
   int i;
```

```
   float sum = 0;
   for (i = 1;i <= n * 2;i = i + 2) {
      sum = sum + (pow(x, i) / (float)fact(i));
   }
   return sum;
}
long s108(int n, int x) {
   int i;
   long sum = 0;
   for (i = 1;i <= n;i++) {
      sum = sum + pow(x, i);
   }
   return sum;
}
long s109(int n) {
   int i;
   long sum = 0, s = 1;
   for (i = 1;i <= n;i++) {
      sum = sum + s;
      s = s + s;
   }
   return sum;
}

float s110(int n) {
   int i;
   float sum = 0;
   for (i = 1;i <= n;i++) {
      //printf("\nsum=%f, %f", sum, (1.0 / (i * i)));
      sum = sum + (1 / i * i);
      //printf("\nsum=%f, %f", sum, (1.0 / (i * i)));
   }
   return sum;
}
float s111(int n) {
   int i, sum = 1, flag = 1;
   for (i = 2;i <= n;i++) {
      if (flag == 0) {
         sum = sum - (1.0 / (float)i * i);
         flag = 1;
      }
      else {
         sum = sum + (1.0 / (float)i * i);
         flag = 0;
      }
   }
   return sum;
}
float s112(int n, int x) {
   int i, s = 0;
   float sum = 0;
   for (i = 1;i <= n;i++) {
      sum = sum + (pow(x, s) / fact(s));
      s = s + 2;
```

```
    }
    return sum;
}
long fact(int n) {
    int i;
    long fact = 1;
    for (i = 2;i <= n;i++)
       fact = fact * i;
    return fact;
}
```

Output:

```
         ----------Find out the Sum of following series----------

          0. Exit program
          1. 1 + 2 + 3 + 4 + ... + n
          2. 2 + 4 + 6 + 8 + ... + n
          3. 1 + 3 + 5 + 7 + ... + n
          4. 12 + 22 + 32 + 42 + ... + n
          5. 22 + 42 + 62 + 82 + ... + n
          6. 22 - 42 + 62 - 82 + ... + n
          7. 1^2 + 2^2 + 3^2 + 4^2 + ... + n
          8. 1 + 4 - 9 + 16 - 25 + ... + n
          9. 1! + 2! + 3! + 4! + ... + n
         10. 1/1! + 1/2! + 1/3! + 1/4! + ... + n
         11. 1/22 + 1/42 + 1/62 + 1/82 + ... + n
         12. x + x^2/2! + x^3/3! + x^4/4! + ... + n
         13. x + x^3/3! + x^5/5! + x^7/7! + ... + n
         14. x + x^2 + x^3 + x^4 + ... + n
         15. 1 + 2 4 + 8 + 16 + ... + n
         16. 1 + 1/4 + 1/9 + 1/16 + ... + n
         17. 1/1^2 - 1/2^2 + 1/3^2 - 1/4^2 + ... + n
         18. x + x^2/2! + x^4/4! + x^6/6! + ... + n

         Enter your choice: 1

         Enter n numbers value: 10
         Answer : 55
                  Press any key for Continue …                                  [skip
writing common part]
         Enter your choice: 2

         Enter n numbers value: 10
         Answer : 110

         Enter your choice: 3

         Enter n numbers value: 10
         Answer : 100

         Enter your choice: 4

         Enter n numbers value: 70
         Answer : 24990
```

```
Enter your choice: 5

Enter n numbers value: 100
Answer : 101200

Enter your choice: 6

Enter n numbers value: 8
Answer : -80

Enter your choice: 9

Enter n numbers value: 9
Answer : 409113

Enter your choice: 10

Enter n numbers value: 10
Answer : 1.718

Enter your choice: 11

Enter n numbers value: 11
Answer : 0.1438

Enter your choice: 12

Enter n numbers value: 12
Enter base x value: 2
Answer : 6.389

Enter your choice: 13

Enter n numbers value: 13
Enter base x value: 2
Answer : 3.655

Enter your choice: 14

Enter n numbers value: 14
Enter base x value: 3
Answer : 7174452

Enter your choice: 15

Enter n numbers value: 15
Answer : 32767

Enter your choice: 16

Enter n numbers value: 5
Answer : 1.000
```

```
        Enter your choice: 17

        Enter n numbers value: 5
        Answer : 1.000

        Enter your choice: 18

        Enter n numbers value: 4
        Enter base x value: 2
        Answer : 3.756


/* 113. Write a program to print sum of any 10 numbers using 1-D array. */
#include<stdio.h>
#include<conio.h>

int main() {
   int num[] = { 11,12,13,14,15,16,17,18,19,20 }, i, sum = 0;
   // clrscr();
   for (i = 0; i < 10; i++) {
      sum += num[i];
   }
   printf("\t\nSum of 10 number is: %d", sum);

   // getch();
   return 0;
}
Output:
Sum of 10 number is: 155

/* 114. Write a program to find maximum and minimum element from 1- Dimensional array.
*/
#include<stdio.h>
#include<conio.h>

int main() {
   int num[] = { 18,12,10,80,8,16,17,18,9,20 }, i, min = num[0], max = num[0];
   // clrscr();
   for (i = 0; i < 10; i++) {
      if (min > num[i])
         min = num[i];
      if (max < num[i])
         max = num[i];
   }
   printf("\t\nMaximum number is: %d", max);
   printf("\t\nMinimum number is: %d", min);

   // getch();
   return 0;
}
Output:
Maximum number is: 80
Minimum number is: 8
```

```c
/* 115. Write a program to perform selection sort using 1-D array. */
#include<stdio.h>
#include<conio.h>

void selectionSort(int[], int);

int main() {
   int num[] = { 18,12,10,80,8,16,17,18,9,20 }, i;
   // clrscr();
   printf("\t\nBefore select sort array value is: ");
   for (i = 0; i < 10; i++) {
      printf("%d, ", num[i]);
   }
   selectionSort(num, 10);
   printf("\t\n After select sort array value is: ");
   for (i = 0; i < 10; i++) {
      printf("%d, ", num[i]);
   }

   // getch();
   return 0;
}
void selectionSort(int arr[], int n) {
   int i, j, temp;
   for (i = 0;i < n;i++) {
      for (j = i;j < n;j++) {
         if (arr[i] > arr[j]) {
            temp = arr[i];
            arr[i] = arr[j];
            arr[j] = temp;
         }
      }
   }
}
```

Output:

```
Before select sort array value is: 18, 12, 10, 80, 8, 16, 17, 18, 9, 20,
 After select sort array value is: 8, 9, 10, 12, 16, 17, 18, 18, 20, 80,
```

```c
/* 116. Write a program to perform bubble sort Using 1-D Array. */
#include<stdio.h>
#include<conio.h>

void bubbleSort(int[], int);

int main() {
   int num[] = { 18,12,10,80,8,16,17,50,9,20 }, i;
   // clrscr();
   printf("\t\nBefore select sort array value is: ");
   for (i = 0; i < 10; i++) {
      printf("%d, ", num[i]);
   }
   bubbleSort(num, 10);
   printf("\t\n After select sort array value is: ");
```

```
   for (i = 0; i < 10; i++) {
      printf("%d, ", num[i]);
   }

   // getch();
   return 0;
}
void bubbleSort(int arr[], int n) {
   int i, j, temp;
   for (i = 0;i < n - 1;i++) {
      for (j = 0;j < n - 1 - i;j++) {
         if (arr[j] > arr[j + 1]) {
            temp = arr[j];
            arr[j] = arr[j + 1];
            arr[j + 1] = temp;
         }
      }
   }
}
```

Output:

```
Before select sort array value is: 18, 12, 10, 80, 8, 16, 17, 50, 9, 20,
 After select sort array value is: 8, 9, 10, 12, 16, 17, 18, 20, 50, 80,
```

```
/* 117. Write a program of linear and binary search. */
#include<stdio.h>
#include<conio.h>

int linerSearch(int[], int, int);
int binarySearch(int[], int, int);

int main() {
   int num[] = { 8, 9, 10, 12, 16, 17, 18, 20, 50, 80 }, i, value, at;
   // clrscr();
   printf("\t\nArray value is: ");
   for (i = 0; i < 10; i++) {
      printf("%d, ", num[i]);
   }
   printf("\t\nEnter value from array: ");
   scanf("%d", &value);

   at = linerSearch(num, 10, value);
   if (at >= 0)
      printf("\t\n Search by 'Liner search' value %d At index: %d", value, at);
   else
      printf("\t\n %d is not found OR not present in array", value);

   at = binarySearch(num, 10, value);
   if (at >= 0)
      printf("\t\n Search by 'Binary search' value %d At index: %d", value, at);
   else
      printf("\t\n %d is not found OR not present in array", value);

   // getch();
```

```
    return 0;
}

int linerSearch(int arr[], int n, int value) {
    int at = 0, i, found = 0;
    for (i = 0; i < n; i++) {
        if (arr[i] == value) {
            at = i;
            found = 1;
            break;
        }
    }
    if (found) {
        return at;
    }
    else {
        return -1;
    }
}

int binarySearch(int arr[], int n, int value) {
    int at = 0, start, end, mid, found = 0, temp;

    start = 0;
    end = n - 1;
    while (start <= end) {
        mid = start + (end - start) / 2;
        if (arr[mid] == value) {
            at = mid;
            found = 1;
            break;
        }
        else if (arr[mid] < value) {
            start = mid + 1;
        }
        else {
            end = mid - 1;
        }
    }
    if (found) {
        return at;
    }
    else {
        return -1;
    }
}
```

Output:

```
Array value is: 8, 9, 10, 12, 16, 17, 18, 20, 50, 80,
Enter value from array: 12

 Search by 'Liner search' value 12 At index: 3
 Search by 'Binary search' value 12 At index: 3
```

```
/* 118. Write a program to insert an element in 1-D array at specified place. */
```

```c
#include<stdio.h>
#include<conio.h>

int insertAt(int[], int, int, int);
int main() {
   int num[20] = { 8, 9, 10, 12, 16, 17, 18, 20, 50, 80 }, i, value, at, n = 10;
   // clrscr();
   printf("\t\nArray value is: ");
   for (i = 0; i < n; i++) {
      printf("%d, ", num[i]);
   }
   printf("\t\nEnter value to insert in array: ");
   scanf("%d", &value);
   printf("\t\nEnter index value: ");
   scanf("%d", &at);

   n = insertAt(num, n, value, at);
   printf("\t\nAfter Insert Array value is: ");
   for (i = 0; i < n; i++) {
      printf("%d, ", num[i]);
   }

   // getch();
   return 0;
}

int insertAt(int arr[], int n, int value, int at) {
   int i, v = n;
   if (at >= 0 && at <= n) {
      for (i = v; i > at; i--) {
         arr[i] = arr[i - 1];
      }
      arr[at] = value;
      v++;
   }
   else {
      printf("\t\n Invalid index to insert value");
   }
   return v;
}
```

Output:

```
Array value is: 8, 9, 10, 12, 16, 17, 18, 20, 50, 80,
Enter value to insert in array: 15

Enter index value: 4

After Insert Array value is: 8, 9, 10, 12, 15, 16, 17, 18, 20, 50, 80,
```

```c
/* 119. Write a program to delete an element from 1-D array. */
#include<stdio.h>
#include<conio.h>

int deleteAt(int[], int, int);
int main() {
```

```c
   int num[] = { 8, 9, 10, 12, 16, 17, 18, 20, 50, 80 }, i, value, n = 10;
   // clrscr();
   printf("\t\nArray value is: ");
   for (i = 0; i < n; i++) {
      printf("%d, ", num[i]);
   }
   printf("\t\nEnter value to delete from array: ");
   scanf("%d", &value);

   n = deleteAt(num, n, value);
   printf("\t\nAfter Delete Array value is: ");
   for (i = 0; i < n; i++) {
      printf("%d, ", num[i]);
   }

   // getch();
   return 0;
}
int deleteAt(int arr[], int n, int value) {
   int i, v = n, at;
   // find index of value
   for (i = 0; i < n; i++) {
      if (arr[i] == value) {
         at = i;
         break;
      }
   }

   if (at >= 0 && at < n) {
      for (i = at; i < v - 1; i++) {
         arr[i] = arr[i + 1];
      }
      v--;
   }
   else {
      printf("\t\n Invalid index to delete value");
   }
   return v;
}
```

Output:

```
Array value is: 8, 9, 10, 12, 16, 17, 18, 20, 50, 80,
Enter value to delete from array: 17

After Delete Array value is: 8, 9, 10, 12, 16, 18, 20, 50, 80,
```

```c
/* 120. Write a program to swap even position number with odd position. */
#include<stdio.h>
#include<conio.h>

void swapEvenOdd(int[], int);

int main() {
   int num[] = { 8, 9, 10, 11, 16, 17, 18, 21, 80, 71 }, i, n = 10;
   // clrscr();
```

```
   printf("\t\nArray value is: ");
   for (i = 0; i < n; i++) {
      printf("%d, ", num[i]);
   }

   swapEvenOdd(num, n);

   printf("\t\nAfter Swap Even-Odd position Array value is: ");
   for (i = 0; i < n; i++) {
      printf("%d, ", num[i]);
   }

   // getch();
   return 0;
}

void swapEvenOdd(int arr[], int n) {
   int i, temp;
   for (i = 0; i < n - 1; i += 2) {
      temp = arr[i];
      arr[i] = arr[i + 1];
      arr[i + 1] = temp;
   }
}
```

Output:

```
Array value is: 8, 9, 10, 11, 16, 17, 18, 21, 80, 71,
After Swap Even-Odd position Array value is: 9, 8, 11, 10, 17, 16, 21, 18, 71, 80,
```

```
/* 121. Write a program to Read n x n matrix. Print the original matrix and its
transpose. */
#include<stdio.h>
#include<conio.h>
#define MAX 20
#define MORE 50

void print_matrix(int m[MAX][MAX], int r, int c);
void tra_matrix(int m[MAX][MAX], int r, int c);

int main() {
   int matrix[MAX][MAX], i, j, r, c;
   // clrscr();
   printf("\n\t Enter row and column: ");
   scanf("%d %d", &r, &c);
   for (i = 0;i < r;i++)
      for (j = 0;j < c;j++) {
         printf("\tEnter value of matrix[%d][%d]: ", i, j);
         scanf("%d", &matrix[i][j]);
      }
   printf("\n\t Original matrix\n");
   print_matrix(matrix, r, c);
   printf("\t-----------------------\n");
   printf("\n\t Transpose matrix\n");
   tra_matrix(matrix, r, c);
```

```
   // getch();
   return 0;
}

void print_matrix(int m[MAX][MAX], int r, int c) {
   int i, j;
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         printf("\t%d", m[i][j]);
      }
      printf("\n");
   }
}
void tra_matrix(int m[MAX][MAX], int r, int c) {
   int i, j, tm[MAX][MAX];
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         tm[i][j] = m[j][i];
         printf("\t%d", tm[i][j]);
      }
      printf("\n");
   }
}
```

Output:

```
 Enter row and column: 3 3
Enter value of matrix[0][0]: 1
Enter value of matrix[0][1]: 2
Enter value of matrix[0][2]: 3
Enter value of matrix[1][0]: 4
Enter value of matrix[1][1]: 5
Enter value of matrix[1][2]: 6
Enter value of matrix[2][0]: 7
Enter value of matrix[2][1]: 8
Enter value of matrix[2][2]: 9

 Original matrix
1       2       3
4       5       6
7       8       9
------------------------

 Transpose matrix
1       4       7
2       5       8
3       6       9
```

```
/* 122. Write a Program to Read n x n two matrices A and B and find sum and
multiplication. */
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
#define MAX 20
#define MORE 50
```

```c
void print_matrix(int m[MAX][MAX], int r, int c);
void matrix_sum(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c);
void matrix_mul(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c);

int main() {
   int matrix[MAX][MAX], m2[MAX][MAX], i, j, r, c;
   // clrscr();
   printf("\n\t Enter row (row and column both are same): ");
   scanf("%d", &c);
   r = c;
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         printf("\tEnter value of matrix[%d][%d]: ", i, j);
         scanf("%d", &matrix[i][j]);
      }
   }
   printf("\n\n\tSecond matrix\n");
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         printf("\tEnter value of matrix[%d][%d]: ", i, j);
         scanf("%d", &m2[i][j]);
      }
   }
   printf("\n\t First matrix: \n");
   print_matrix(matrix, r, c);
   printf("\t-----------------------\n");
   printf("\n\t Second matrix: \n");
   print_matrix(m2, r, c);
   printf("\t-----------------------\n");

   printf("\n\t Sum of two matrix: \n");
   matrix_sum(matrix, m2, r, c);
   printf("\t-----------------------\n");
   printf("\n\t Multiplication of two matrix: \n");
   matrix_mul(matrix, m2, r, c);

   // getch();
   return 0;
}

void print_matrix(int m[MAX][MAX], int r, int c) {
   int i, j;
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         printf("\t%d", m[i][j]);
      }
      printf("\n");
   }
}
void matrix_sum(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c) {
   int i, j, s = 0;
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         s = m1[i][j] + m2[i][j];
```

```
            printf("\t%d", s);
         }
         printf("\n");
      }
   }
   void matrix_mul(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c) {
      int i, j, k, sum, n = r;
      for (i = 0; i < n; i++) {
         for (j = 0; j < n; j++) {
            sum = 0;
            for (k = 0; k < n; k++) {
               sum += m1[i][k] * m2[k][j];
            }
            printf("\t%d", sum);
         }
         printf("\n");
      }
   }
```

Output:

```
          Enter row (row and column both are same): 3
        Enter value of matrix[0][0]: 1
        Enter value of matrix[0][1]: 2
        Enter value of matrix[0][2]: 3
        Enter value of matrix[1][0]: 4
        Enter value of matrix[1][1]: 5
        Enter value of matrix[1][2]: 6
        Enter value of matrix[2][0]: 7
        Enter value of matrix[2][1]: 8
        Enter value of matrix[2][2]: 9


        Second matrix
        Enter value of matrix[0][0]: 9
        Enter value of matrix[0][1]: 8
        Enter value of matrix[0][2]: 7
        Enter value of matrix[1][0]: 6
        Enter value of matrix[1][1]: 5
        Enter value of matrix[1][2]: 4
        Enter value of matrix[2][0]: 3
        Enter value of matrix[2][1]: 2
        Enter value of matrix[2][2]: 1

         First matrix:
        1       2       3
        4       5       6
        7       8       9
        ------------------------

         Second matrix:
        9       8       7
        6       5       4
        3       2       1
        ------------------------
```

```
         Sum of two matrix:
        10      10      10
        10      10      10
        10      10      10
        ------------------------

         Multiplication of two matrix:
        30      24      18
        84      69      54
        138     114     90
```

```
/* 123. Write a program in C to enter marks of 10 students. Count how many students
have secured marks above 80 and below 40.  */

#include<stdio.h>
#include<conio.h>

int main() {
   int marks[10], i, above80 = 0, below40 = 0;
   // clrscr();
   for (i = 0;i < 10;i++) {
      printf("\tEnter marks of student %d: ", i + 1);
      scanf("%d", &marks[i]);
      if (marks[i] > 80) {
         above80++;
      }
      else if (marks[i] < 40) {
         below40++;
      }
   }
   printf("\n\tNumber of students secured marks above 80: %d", above80);
   printf("\n\tNumber of students secured marks below 40: %d", below40);

   // getch();
   return 0;
}
```

Output:

```
        Enter marks of student 1: 50
        Enter marks of student 2: 38
        Enter marks of student 3: 60
        Enter marks of student 4: 76
        Enter marks of student 5: 80
        Enter marks of student 6: 90
        Enter marks of student 7: 85
        Enter marks of student 8: 92
        Enter marks of student 9: 45
        Enter marks of student 10: 64

        Number of students secured marks above 80: 3
        Number of students secured marks below 40: 1
```

```
/* 124. An election is contested by 5 candidates. The candidates are numbered 1 to 5
and the voting is done by marking the candidate number on the ballot paper. Write a
program in C to read the ballots and count the votes cast for each candidate using an
```

```
array variable count. In case a number read is outside the range 1 to 5, the ballot
should be considered as a spoilt ballot and the program should also count the number of
spoilt ballots. */

#include<stdio.h>
#include<conio.h>

int main() {
   int votes[5] = { 0 }, vote, i, spoilt = 0, total = 0;
   // clrscr();
   printf("\n\tEnter votes (1 to 5). Enter 0 to stop voting:\n");
   while (1) {
      printf("\tVote: ");
      scanf("%d", &vote);
      if (vote == 0) {
         break;
      }
      else if (vote >= 1 && vote <= 5) {
         votes[vote - 1]++;
         total++;
      }
      else {
         spoilt++;
      }
   }
   printf("\n\tVote count:\n");
   for (i = 0; i < 5; i++) {
      printf("\tCandidate %d: %d votes\n", i + 1, votes[i]);
   }
   printf("\tSpoilt ballots: %d\n", spoilt);
   printf("\tTotal valid votes: %d\n", total);

   // getch();
   return 0;
}


/* 125. Write a program to convert a decimal number to any base(binary/octal/hexadecimal
etc.)*/

=> program number 54, 55 and 56


/* 126. Check whether the given square Matrix is Magic Matrix or Not.
   (If sum of all rows, columns and both diagonals are same then it is called Magic Matrix)
*/

#include <stdio.h>
#include <stdlib.h>
#define MAX 20

void print_matrix(int m[MAX][MAX], int r, int c);
void magic_matrix(int m[MAX][MAX], int r, int c);
```

```c
int main() {
   int matrix[MAX][MAX], i, j, r, c;

   printf("\n\tEnter rows and columns (square matrix required): ");
   if (scanf("%d %d", &r, &c) != 2) {
      printf("Invalid input.\n");
      return 1;
   }

   if (r <= 0 || c <= 0 || r > MAX || c > MAX) {
      printf("Rows/columns must be between 1 and %d.\n", MAX);
      return 1;
   }

   if (r != c) {
      printf("This program requires a square matrix (rows == columns).\n");
      return 1;
   }

   for (i = 0; i < r; i++)
      for (j = 0; j < c; j++) {
         printf("\tEnter value of matrix[%d][%d]: ", i, j);
         if (scanf("%d", &matrix[i][j]) != 1) {
            printf("Invalid input.\n");
            return 1;
         }
      }

   print_matrix(matrix, r, c);
   magic_matrix(matrix, r, c);

   return 0;
}

void print_matrix(int m[MAX][MAX], int r, int c) {
   int i, j;
   printf("\t-------------------------\n");
   printf("\tGiven matrix:\n");
   for (i = 0; i < r; i++) {
      for (j = 0; j < c; j++) {
         printf("\t%d", m[i][j]);
      }
      printf("\n");
   }
}
void magic_matrix(int m[MAX][MAX], int r, int c) {
   int i, j, sc = 0, sr[MAX] = { 0 }, sx = 0, sy = 0, n = r - 1, scolumn[MAX] = { 0 },
isMagic = 1, magic;
   printf("\t-------------------------\n");
   printf("\tMagic matrix: \n");
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         sc += m[i][j];
         sr[j] += m[i][j];
```

```
            printf("\t%d", m[i][j]);
            if (i == j) { sx += m[i][j]; }
            if (i == n) { sy += m[i][j]; }
         }
         scolumn[i] = sc;
         printf("\t:%d\n", sc);
         sc = 0;
         n--;
      }
      for (i = 0;i < r;i++) {
         printf("\t:%d", sr[i]);
      }
      printf("\n\n\tsum of sx=%d\n\tsum of sy=%d\n", sx, sy);
      // sum of rows (sr), sum of columns (scolumn) and both diagonals (sx, sy) are same then
it is called Magic Matrix
      if (sx == sy) { // row and column count are same than
         magic = sx;
         isMagic = 1;
         for (i = 0; i < r; i++) {
            if (sr[i] != magic) { // sum of rows is same or not
               isMagic = 0;
               break;
            }
            if (scolumn[i] != magic) { // sum of columns is same or not
               isMagic = 0;
               break;
            }
         }
         if (isMagic) {
            printf("\n\tAll sums are equal");
            printf("\n\tThe given matrix is a Magic Matrix.\n");
         }
         else {
            printf("\n\tThe given matrix is NOT a Magic Matrix.\n");
         }
      }
      else {
         printf("\n\tThe given matrix is NOT a Magic Matrix.\n");
      }
}
```

Output:

```
        Enter rows and columns (square matrix required): 3 3
        Enter value of matrix[0][0]: 2
        Enter value of matrix[0][1]: 7
        Enter value of matrix[0][2]: 6
        Enter value of matrix[1][0]: 9
        Enter value of matrix[1][1]: 5
        Enter value of matrix[1][2]: 1
        Enter value of matrix[2][0]: 4
        Enter value of matrix[2][1]: 3
        Enter value of matrix[2][2]: 8
        ------------------------
        Given matrix:
        2       7       6
```

```
        9       5       1
        4       3       8
        ------------------------
        Magic matrix:
        2       7       6       :15
        9       5       1       :15
        4       3       8       :15
        :15     :15     :15

        sum of sx=15
        sum of sy=15

        All sums are equal
        The given matrix is a Magic Matrix.
```

```c
/* 127. Write a program to find string length
1) Using String function strlen() and 2) Without Using String Function.*/
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include<conio.h>
int str_len(char str[]);
int main() {
   char str[30];
   int n;
   printf("\n\tEnter string: ");
   scanf(" %[^\n]", str);
   n = strlen(str);
   printf("\n\tString length using strlen(): %d", n);
   n = str_len(str);
   printf("\n\tString length without using strlen(): %d", n);
   return 0;
}
int str_len(char str[]) {
   int i = 0;
   while (str[i] != '\0') {
      i++;
   }
   return i;
}
```

Output:

```
        Enter string: hey what my length ?

        String length using strlen(): 20
        String length without using strlen(): 20
```

```c
/* 128. Write a program to print character with the ASCII code from 0 to 255. */
#include <stdio.h>
#include <conio.h>
int main() {
   int i;
   clrscr();
   printf("\n\tASCII characters from 0 to 255:\n\t");
   for (i = 0; i <= 255; i++) {
```

```
      printf("%d = %c\t", i, i);
   }
   return 0;
}
```

Output:

```
        ASCII characters from 0 to 255:
        0 =     1 =     2 =     3 =     4 =     5 =     6 =     7 =     8 =     9 =
10 =
        11 =
        12 =
        14 =    15 =    16 =    17 =    18 =    19 =    20 =    21 =    22 =    23 =
24 =    25 =    26 = ♀  27 =    8 =     29 =    30 =    31 =    32 =        33 = !  34
= "  35 = #  36 = $  37 = %  38 = &  39 = '  40 = (  41 = )  42 = *  43 = +  44 = ,  45
= -  46 = .  47 = /  48 = 0  49 = 1  50 = 2  51 = 3      52 = 4  53 = 5  54 = 6  55 = 7
56 = 8  57 = 9  58 = :  59 = ;  60 = <  61 = =  62 = >  63 = ?  64 = @  65 = A  66 = B
67 = C  68 = D  69 = E  70 = F      71 = G  72 = H  73 = I  74 = J  75 = K  76 = L  77
= M  78 = N  79 = O  80 = P  81 = Q  82 = R  83 = S  84 = T  85 = U  86 = V  87 = W  88
= X  89 = Y      90 = Z  91 = [  92 = \  93 = ]  94 = ^  95 = _  96 = `  97 = a  98 = b
99 = c  100 = d 101 = e 102 = f 103 = g 104 = h 105 = i 106 = j 107 = k 108 = l     109
= m 110 = n 111 = o 112 = p 113 = q 114 = r 115 = s 116 = t 117 = u 118 = v 119 = w 120
= x 121 = y 122 = z 123 = { 124 = | 125 = } 126 = ~ 127 =       128 = Ç 129 = ü 130 = é
131 = â 132 = ä 133 = à 134 = å 135 = ç 136 = ê 137 = ë 138 = è 139 = ï 140 = î 141 = ì
142 = Ä 143 = Å 144 = É 145 = æ 146 = Æ     147 = ô 148 = ö 149 = ò 150 = û 151 = ù 152
= ÿ 153 = Ö 154 = Ü 155 = ¢ 156 = £ 157 = ¥ 158 = ₧ 159 = ƒ 160 = á 161 = í 162 = ó 163
= ú 164 = ñ 165 = Ñ     166 = ª 167 = º 168 = ¿ 169 = ⌐ 170 = ¬ 171 = ½ 172 = ¼ 173 = ¡
174 = « 175 = » 176 = ░ 177 = ▒ 178 = ▓ 179 = │ 180 = ┤ 181 = ╡ 182 = ╢ 183 = ╖ 184 = ╕
185 = ╣ 186 = ║ 187 = ╗ 188 = ╝ 189 = ╜ 190 = ╛ 191 = ┐ 192 = └ 193 = ┴ 194 = ┬ 195 = ├
196 = ─ 197 = ┼ 198 = ╞ 199 = ╟ 200 = ╚ 201 = ╔ 202 = ╩ 203 = ╦     204 = ╠ 205 = ═ 206
= ╬ 207 = ╧ 208 = ╨ 209 = ╤ 210 = ╥ 211 = ╙ 212 = ╘ 213 = ╒ 214 = ╓ 215 = ╫ 216 = ╪ 217
= ┘ 218 = ┌ 219 = █ 220 = ▄ 221 = ▌ 222 = ▐     223 = ▀ 224 = α 225 = ß 226 = Γ 227 = π
228 = Σ 229 = σ 230 = µ 231 = τ 232 = Φ 233 = Θ 234 = Ω 235 = δ 236 = ∞ 237 = φ 238 = ε
239 = ∩ 240 = ≡ 241 = ±     242 = ≥ 243 = ≤ 244 = ⌠ 245 = ⌡ 246 = ÷ 247 = ≈ 248 = ° 249
= ∙ 250 = · 251 = √ 252 = ⁿ 253 = ² 254 = ■ 255 =
```

```
/* 129. Write a program to copy one string to another without using strcpy() library
function.*/
#include <stdio.h>
#include <conio.h>
void str_cpy(char str[]);
int main() {
   char str[30];
   printf("\n\tEnter string: ");
   scanf(" %[^\n]", str);
   str_cpy(str);
   return 0;
}
void str_cpy(char str[]) {
   int i = 0;
   char new_str[30] = "";
   //printf("\n\t%s", str);

   //n = str_len(str);
   //printf("%d",n);
   while (str[i] != '\0') {
```

```
      new_str[i] = str[i];
      i++;
   }
   printf("\n\tNew copy string: %s", new_str);
}
```

Output:

```
        Enter string: hey this is same copy ?

        New copy string: hey this is same copy ?
```

```
/*
130. Write a program to string compare case-sensitive.
131. Write a program to string compare case-insensitive.
*/
#include <stdio.h>
#include <conio.h>
#include <ctype.h>
int str_com(char str1[], char str2[]);
int str_comi(char str1[], char str2[]);
int main() {
   char str1[30], str2[30];
   int n;
   printf("\n\tEnter String 1: ");
   scanf(" %[^\n]", str1);
   printf("\n\tEnter String 2: ");
   scanf(" %[^\n]", str2);
   n = str_com(str1, str2);
   if (n == 1) {
      printf("\n\tcase-sensitive: Both string are same");
   }
   else {
      printf("\n\tcase-sensitive: Both string are not same");
   }
   n = str_comi(str1, str2);
   if (n == 1) {
      printf("\n\tcase-insensitive: Both string are same");
   }
   else {
      printf("\n\tcase-insensitive: Both string are not same");
   }
   return 0;
}
int str_com(char str1[], char str2[]) {
   int n, m, i = 0;
   n = strlen(str1);
   m = strlen(str2);
   if (n != m) {
      return 0;
   }
   while (str1[i] != '\0') {
      if (str1[i] != str2[i]) {
         return 0;
      }
```

```
      i++;
   }
   return 1;
}
int str_comi(char str1[], char str2[]) {
   int n, m, i = 0;
   n = strlen(str1);
   m = strlen(str2);
   if (n != m) {
      return 0;
   }
   while (str1[i] != '\0') {
      // convert both characters to lower case for case-insensitive comparison
      if (tolower(str1[i]) != tolower(str2[i])) {
         return 0;
      }
      i++;
   }
   return 1;
}
```

Output:

```
        Enter String 1: VishaL

        Enter String 2: vishal

        case-sensitive: Both string are not same
        case-insensitive: Both string are same
```

```
/* 132. Write a program that will read a single word and rewrite it in the alphabetical
order. I.e. the word STRING should be written as GINRST.*/
#include <stdio.h>
#include <string.h>
#include<conio.h>
void str_order(char str[]);
int main() {
   char str[30];
   printf("\n\tEnter string: ");
   scanf(" %[^\n]", str);
   str_order(str);
   return 0;
}
void str_order(char str[]) {
   int i, j;
   char temp;
   int n = strlen(str);
   for (i = 0; i < n - 1; i++) {
      for (j = i + 1; j < n; j++) {
         // ACSII value based comparison
         if (str[i] > str[j]) {
            temp = str[i];
            str[i] = str[j];
            str[j] = temp;
         }
      }
```

```
    }
    printf("\n\tString in alphabetical order: %s", str);
}
```

Output:

```
        Enter string: VISHAL

        String in alphabetical order: AHILSV
```

```
/* 133. Write a program to count vowels using switch case and  getch() function.*/
#include <stdio.h>
#include <conio.h>
int main() {
   char ch;
   int vcount = 0, ccount = 0;
   clrscr();
   printf("\n\tEnter characters (Press '.' to stop): \n");
   do {
      ch = getch();
      if (ch == '.') {
         break;
      }
      switch (ch) {
      case 'a':
      case 'e':
      case 'i':
      case 'o':
      case 'u':
      case 'A':
      case 'E':
      case 'I':
      case 'O':
      case 'U':
         vcount++;
         break;
      default:
         ccount++;
         break;
      }
      printf("%c", ch);
   } while (1);
   printf("\n\n\tTotal Vowels: %d", vcount);
   printf("\n\tTotal Consonants: %d", ccount);
   return 0;
}
```

Output:

```
        Enter characters (Press '.' to stop):
gskjqpehsnvgs asvrucl wiqk gdi k

        Total Vowels: 5
        Total Consonants: 27
```

```
/* 134. Write a program to count word in sentence.
Enter String : I am fine
Output : 3*/
```

```c
#include <stdio.h>
#include <conio.h>
int main() {
   char str[100];
   int i, word_count = 1;
   printf("\n\tEnter string: ");
   scanf(" %[^\n]", str);
   // count words
   for (i = 0; str[i] != '\0'; i++) {
      if (str[i] == ' ' && str[i + 1] != ' ') {
         word_count++;
      }
   }
   printf("\n\tTotal words: %d", word_count);
   return 0;
}
```

Output:

```
        Enter string: hey how many word in this line

        Total words: 7
```

```c
/* 135. Write a program to find character in string.
Input  :
Enter String : I am fine
Enter Character : m
Output :
Character position : 4
             Or
Character Not found
Note :  if character is not found than output will be  */
#include <stdio.h>
#include <conio.h>
int main() {
   char str[100], ch;
   int i, flag = 0, position;
   printf("\n\tEnter string: ");
   scanf(" %[^\n]", str);
   printf("\n\tEnter character to find: ");
   scanf(" %c", &ch);
   for (i = 0; str[i] != '\0'; i++) {
      if (str[i] == ch) {
         flag = 1;
         position = i + 1;
         break; // exit loop after finding first
      }
   }
   if (flag) {
      printf("\n\tCharacter '%c' found at position: %d", ch, position);
   }
   else {
      printf("\n\tCharacter '%c' not found in the string.", ch);
   }
   return 0;
}
```

Output:

```
        Enter string: I Am Vishal You Are ?

        Enter character to find: V

        Character 'V' found at position: 6
```

```
/* 136. Write a program to replace character from given string.
Input :
 Enter String : I am fine
 Find : am
 Replace : are
Output :
 I are out*/
#include <stdio.h>
#include <conio.h>
int main() {
   char str[100], find[20], replace[20];
   int i, j, k, flag, pos, len_find, len_replace;
   clrscr();
   printf("\n\tEnter string: ");
   scanf(" %[^\n]", str);
   printf("\n\tEnter string to find: ");
   scanf(" %[^\n]", find);
   printf("\n\tEnter string to replace: ");
   scanf(" %[^\n]", replace);

   for (len_find = 0; find[len_find] != '\0'; len_find++);
   for (len_replace = 0; replace[len_replace] != '\0'; len_replace++);

   for (i = 0; str[i] != '\0'; i++) {
      flag = 1;
      for (j = 0; find[j] != '\0'; j++) {
         if (str[i + j] != find[j]) {
            flag = 0;
            break;
         }
      }
      if (flag) {
         pos = i;
         break;
      }
   }

   if (flag) {
      if (len_replace > len_find) {
         for (k = strlen(str); k >= pos + len_find; k--) {
            str[k + (len_replace - len_find)] = str[k];
         }
      }
      else if (len_replace < len_find) {
         for (k = pos + len_find; str[k] != '\0'; k++) {
            str[k - (len_find - len_replace)] = str[k];
         }
```

```
            str[k - (len_find - len_replace)] = '\0';
        }
        for (j = 0; replace[j] != '\0'; j++) {
            str[pos + j] = replace[j];
        }
        printf("\n\tModified string: %s", str);
    }
    else {
        printf("\n\tString to find not found.");
    }
    return 0;
}
```

Output:

```
        Enter string: hey this on not

        Enter string to find: on

        Enter string to replace: is

        Modified string: hey this is not
```

C Program Created on Class:

Array

```
#include<stdio.h>
#include<conio.h>
#include <stdlib.h>
#define SIZE 20

int nsum(int[], int);
void display(int[], int);
int average(int[], int);
int findMax(int[], int);
int findMin(int[], int);
void bubble(int[], int);   // bubble sort
int find(int[], int, int); // Linear search
int binary_search(int[], int, int); // binary search
int delete_element(int[], int, int);
int menu();

int main() {
    int i, a[SIZE], n, x, y, j, v = 1;
    // clrscr();
    printf("\n\tHow many number: ");
    scanf("%d", &n);
```

```
   for (i = 0;i < n;i++) {
      printf("\tEnter %d number: ", i + 1);
      scanf("%d", &a[i]);
   }

   do {
      v++;
      x = menu();
      switch (x) {
      case 0: exit(1);
      case 1: display(a, n); break;
      case 2: printf("\n\t\tNumbers sum is : %d\n", nsum(a, n)); break;
      case 3: printf("\n\t\tNumbers average is : %d\n", average(a, n)); break;
      case 4: bubble(a, n); break;
      case 5: {
         printf("\n\t\tEnter finding number: ");
         scanf("%d", &y);

         j = find(a, n, y);
         j != -1 ? printf("\n\t\tYes, %d is present at index %d\n", y, j) :
printf("\n\t\tNo, %d is Not found\n", y);
         break;
      }
      case 6: printf("\n\t\tMaximum value is %d\n", findMax(a, n)); break;
      case 7: printf("\n\t\tMinimum value is %d\n", findMin(a, n)); break;
      case 8: {
         printf("\n\t\tEnter finding number: ");
         scanf("%d", &y);

         j = binary_search(a, n, y);
         printf("%d", j);
         j != -1 ? printf("\n\t\tYes, %d is present at index %d\n", y, j) :
printf("\n\t\tNo, %d is Not found\n", y);
         break;
      }
      case 9: {
         printf("\n\tEnter element Which you wan to delete: ");
         scanf("%d", &y);
         j = delete_element(a, y, n);
         if (j == -1) {
            printf("\n\tNot Found! Enter valid element form array.\n");
         }
         else {
            printf("\n\tElement deleted.\n");
            n--; // now total element is 1 reduse
         }
         break;
      }
      case 10: {
         if (n == SIZE) {
            printf("\n\tArray limit is full! not possible to adding more element\n");
         }
         else {
            printf("\n\tEnter element Which you wan to add: ");
```

```
            scanf("%d", &y);
            a[n] = y;
            n++; // now total element is 1 increase
            printf("\n\tElement added.\n");
         }
         break;
      }

      default: printf("\n\t\tEnter valid number from menu\n");
      }
   } while (true && v < 50);
}

int delete_element(int a[], int v, int n) {
   int i, d = -1;
   for (i = 0;i < n;i++) {
      if (v == a[i]) {
         d = i;
         break;
      }
   }
   if (d == -1) {
      return d;
   }
   for (i = d;i < n;i++) {
      a[i] = a[i + 1];
   }
   return d;
}

int nsum(int a[], int n) {
   int i, sum = 0;
   for (i = 0;i < n;i++) {
      sum = sum + a[i];
   }
   return sum;
}

int average(int a[], int n) {
   int i, sum = 0;
   for (i = 0;i < n;i++) {
      sum = sum + a[i];
   }
   return sum / n;
}
int findMin(int a[], int n) {
   int i, min = a[0];
   for (i = 0;i < n;i++) {
      if (min > a[i])
         min = a[i];
   }
   return min;
}
int findMax(int a[], int n) {
```

```
   int i, max = 0;
   for (i = 0;i < n;i++) {
      if (max < a[i])
         max = a[i];
   }
   return max;
}
int find(int a[], int n, int y) { // Linear search
   int i;
   for (i = 0;i < n;i++) {
      if (y == a[i])
         return i;
   }
   return -1;
}
int binary_search(int a[], int n, int y) {
   int mid, s = 0, e = n - 1;
   bubble(a, n); // binary search work only on sorted array
   while (s <= e) {
      mid = s + (e - s) / 2;
      if (a[mid] == y)
         return mid;
      //printf("mid=%d, a[mid]=%d",mid,a[mid]);
      if (a[mid] > y) {
         e = mid - 1;
         //printf("e=%d",e);
      }
      else {
         s = mid + 1;
      }
   }
   return -1;
}

void bubble(int a[], int n) { // bubble sort
   int i, t, j;
   for (i = 0;i < n - 1;i++) {
      for (j = 0;j < n - 1 - i;j++) {
         if (a[j] > a[j + 1]) {
            t = a[j];
            a[j] = a[j + 1];
            a[j + 1] = t;
         }
      }
   }
   display(a, n);
}

void display(int a[], int n) {
   int i;
   printf("\n\t");
   for (i = 0;i < n;i++) {
      printf("\t%d", a[i]);
   }
```

```
    printf("\n");
}

int menu() {
    int i;

    printf("\n\t 0. Exit program");
    printf("\n\t 1. display numbers");
    printf("\n\t 2. get numbers sum");
    printf("\n\t 3. get numbers average");
    printf("\n\t 4. sorting numbers by bubble sort");
    printf("\n\t 5. find number");
    printf("\n\t 6. find maxnumber number");
    printf("\n\t 7. find minnumber number");
    printf("\n\t 8. find by binary search");
    printf("\n\t 9. delete element");
    printf("\n\t10. insert element");
    printf("\n\t Enter number which you perform: ");
    scanf("%d", &i);
    return i;
}
```

Output:

```
How many number: 5
Enter 1 number: 1
Enter 2 number: 5
Enter 3 number: 2
Enter 4 number: 4
Enter 5 number: 3

 0. Exit program
 1. display numbers
 2. get numbers sum
 3. get numbers average
 4. sorting numbers by bubble sort
 5. find number
 6. find maxnumber number
 7. find minnumber number
 8. find by binary search
 9. delete element
10. insert element
 Enter number which you perform: 1

        1       5       2       4       3

 Enter number which you perform: 2

        Numbers sum is : 15

 Enter number which you perform: 3

        Numbers average is : 3
```

```
 Enter number which you perform: 4

        1       2       3       4       5

 Enter number which you perform: 5

        Enter finding number: 3

        Yes, 3 is present at index 2

 Enter number which you perform: 6

        Maximum value is 5

 Enter number which you perform: 7

        Minimum value is 1

 Enter number which you perform: 8

        Enter finding number: 3

        1       2       3       4       5

        Yes, 3 is present at index 2

 Enter number which you perform: 9

Enter element Which you want to delete: 5

Element deleted.

 Enter number which you perform: 1

        1       2       3       4

 Enter number which you perform: 10

Enter element Which you want to add: 5

Element added.

 Enter number which you perform: 1

        1       2       3       4       5
```

Character

```
#include<stdio.h>
#include<conio.h>
```

```c
#include<ctype.h>

void check_char(char);
char convert(char);

int main() {
   char ch;
   // clrscr();

   printf("\n\n\tEnter any character: ");
   scanf("%c", &ch);

   // find type
   check_char(ch);

   // convert upper to lower & lower to upper
   printf("\n\tConverted: %c", convert(ch));

   getch();
   return 0;
}

void check_char(char ch) {
   if (isdigit(ch))
      printf("\n\n\t%c is a Digit", ch);
   else if (isspace(ch))
      printf("\n\n\t%c is a Space", ch);
   else if (isalpha(ch)) {
      printf("\n\n\t%c is an Alphabet", ch);
      if (islower(ch))
         printf("\n\n\t%c is in lowercase", ch);
      else
         printf("\n\n\t%c is in uppercase", ch);
   }
   else if (isalnum(ch))
      printf("\n\n\t%c is an Alphanumeric character", ch);
   else
      printf("\n\n\t%c ", ch);
}

char convert(char ch) {
   if (islower(ch))
      return toupper(ch);
   else
      return tolower(ch);
}
```

Output:

1.

```
Enter any character: V
```

```
        V is an Alphabet

        V is in uppercase
        Converted: v

       2.
        Enter any character:


          is a Space
        Converted:

       3.
       Enter any character: 8


        8 is a Digit
        Converted: 8
```

Prime & Circular Prime Number:

```c
#include<stdio.h>
#include<conio.h>
#include<math.h>

int isPrime(int);
int isCircular_prime(int);

int main() {
   int n;
   // clrscr();

   printf("\n\tEnter number : ");
   scanf("%d", &n);

   1 == isCircular_prime(n) ? printf("Yes, number is circular prime") : printf("No,
number is not circular prime");
   /*
   A circular prime number is a prime number that remains prime under all rotations of
its digits.
   EX. n = 197
   197 → prime
   971 → prime
   719 → prime
   All rotations are prime ⇒ 197 is a circular prime.
   */

   getch();
   return 0;
}

int isPrime(int n) {
```

```
   int i;
   for (i = 2;i <= n / 2;i++) {
      if (n % i == 0)
         return 0;
   }
   return 1;
}

int isCircular_prime(int n) {
   int d = 0, p = 1, rem, cp = 0, t = n, i;
   while (t > 0) {
      d++;
      t /= 10;
   }

   for (i = 1; i < d; i++)  // p = 10^(digits-1)
      p = p * 10;

   // printf("%d %d\n", d, p);

   while (d > 0) {
      rem = n % p;
      //printf("\nrem=%d", rem);
      cp = (n / p) + (rem * 10);

      if (0 == (isPrime(cp))) return 0;

      n = cp;
      //printf("cp=%d n=%d", cp, n);
      d--;
   }

   return 1;
}
```

Output:

```
        Enter number : 197
Yes, number is circular prime
```

File Handling: 1.

```
#include<stdio.h>
#include<conio.h>

int main() {
   int i, n, v;
   char ch, s[150], name[50];
   FILE* f1;
   FILE* fnum, * fodd, * feven;
   // clrscr();
```

```
    // ----------- Write in Loop ------------
    f1 = fopen("MCA.txt", "a");

    printf("\n\tHow many student ? : ");
    scanf("%d", &n);
    for (i = 1;i <= n;i++) {
       printf("\n\tEnter %d student name: ", i);
       scanf(" %s", s);
       fprintf(f1, "\t%s\n", s);
    }

    printf("\n\tEnter file name: ");
    // scanf("%s", name);
    gets(s);


    // ------------ Write String --------------
    f1 = fopen(name, "a");

    flushall();

    printf("\n\tEnter paragraph: ");
    scanf("%[^\n]s", s);
    //gets(s);

    fprintf(f1, "%s", s); // write string


    // --------------- Read Full File String ---------
    f1 = fopen(name, "r");
    printf("\n\t%s file data:- \n", name);
    while ((ch = getc(f1)) != EOF) {
       printf("%c", ch);
    }

    // read number from file and spereat even and odd number in two file
    fnum = fopen("fnum.txt", "r");
    fodd = fopen("fodd.txt", "w");
    feven = fopen("feven.txt", "w");
    while (!feof(fnum)) {
       fscanf(fnum, "%d", &v); // read integer from file and value store in v vareable
       if (v / 2 != 0) {
          fprintf(fodd, "%d ", v);
       }
       else {
          fprintf(feven, "%d ", v);
       }
    }
    fclose(fnum);
    fclose(fodd);
    fclose(feven);

    fclose(f1);
    getch();
```

```
    return 0;
}
```

File Handling: 2.

```
#include<stdio.h>
#include<conio.h>

int isPrime(int);

int main() {
    int n, i = 2, v = 0;
    FILE* fnum, * fodd, * feven, * fprime;
    // clrscr();

    // ----------- read integer data from fnum.txt file and if odd than store fodd.txt
file else store feven.txt file
    fnum = fopen("fnum.txt", "r");
    fodd = fopen("fodd.txt", "w");
    feven = fopen("feven.txt", "w");
    while (!feof(fnum)) { // (n = getw(fnum)) != EOF
        fscanf(fnum, "%d", &n); // read integer from file and value store in v vareable
        //printf("%d", n);
        if (n % 2 != 0) {
            fprintf(fodd, "%d ", n);
        }
        else {
            fprintf(feven, "%d ", n);
        }
    }
    printf("Work Done");
    fclose(fnum);
    fclose(fodd);
    fclose(feven);

    // ------------ Write prime number in file
    fprime = fopen("fprime.txt", "w");
    printf("\n\tEnter how many prime numbers store: ");
    scanf("%d", &n);
    while (v < n) {
        if (isPrime(i)) {
            v++;
            fprintf(fprime, "%d. %d\n", v, i); // write numbers in file
            // printf("%d ", i);
        }
        i++;
    }
    printf("Work Done");
    fclose(fprime);
    getch();
    return 0;
}
```

```
int isPrime(int n) {
   int i;
   for (i = 2;i <= n / 2;i++) {
      if (n % i == 0)
         return 0;
   }
   return 1;
}
```

For Loop:

```
#include<stdio.h>
#include<conio.h>

void table(int);
void ascii();
void gap10();
void even();
void odd();

int main() {
   int i, n, v;
   // clrscr();

   for (i = 1;i <= 10;i++)
      printf("\ti = %d", i);

   printf("\n");
   i = 1;
   for (;;) {
      printf("\ti = %d", i);
      if (i >= 10)
         break;
      else
         i++;
   }

   /*
   printf("\n");
   for(;;){ // infinite loop
      printf("\n\tHey There");
   }
   */

   printf("\n");
   for (i = 1; i <= 100; i++);
   {
      printf("\ti = %d", i);
   }
```

```
   printf("\n");
   for (i = 100; i > 0; i -= 10) {
      printf("\ti = %d", i);
   }

   printf("\n");
   printf("\n\tEnter which table you need: ");
   scanf("%d", &n);
   table(n);
   v = getch();
   printf("\n\t%c", v);

   printf("\n");
   ascii();
   v = getch();
   printf("\n\t%c", v);

   printf("\n");
   gap10();

   printf("\n");
   even();
   v = getch();
   printf("\n\t%c", v);

   printf("\n");
   odd();
   v = getch();
   printf("\n\t%c", v);

   getch();
   return 0;
}

void gap10() {
   int i;
   char n;
   for (i = 1; i <= 100; i++) {
      printf("\ti = %d", i);
      if (i % 10 == 0) {
         // n = getch();
         printf("\t%c\n", n);
      }
   }
}

void even() {
   int i;
   printf("\n\tEven number=> \n");
   for (i = 1;i <= 100;i++) {
      if (i % 2 == 0)
         printf("i = %d\t", i);
      else
         continue;
```

```
   }
}

void odd() {
   int i;
   printf("\todd number=> \n");
   for (i = 1;i <= 100;i++) {
      if (i % 2 == 0)
         continue;
      else
         printf("i = %d\t", i);
   }
}

void table(int n) {
   int i;
   for (i = 1;i <= 10;i++) {
      printf("\n\t%d x %d = %d", n, i, n * i);
   }
}

void ascii() {
   int i;

   int c = 65;
   printf("\n\tASCII for A to Z and a to z\n");
   for (i = 1;i <= 26;i++) {
      printf("\t%d=>%c\t", c, c);
      printf("\t%d=>%c\n", c + 32, c + 32);
      c = c + 1;
   }
}
```

Output:

```
        i = 1   i = 2   i = 3   i = 4   i = 5   i = 6   i = 7   i = 8   i = 9   i = 10
        i = 1   i = 2   i = 3   i = 4   i = 5   i = 6   i = 7   i = 8   i = 9   i = 10
        i = 101
        i = 100 i = 90  i = 80  i = 70  i = 60  i = 50  i = 40  i = 30  i = 20  i = 10

        Enter which table you need: 8

        8 x 1 = 8
        8 x 2 = 16
        8 x 3 = 24
        8 x 4 = 32
        8 x 5 = 40
        8 x 6 = 48
        8 x 7 = 56
        8 x 8 = 64
        8 x 9 = 72
        8 x 10 = 80
```

```
        ASCII for A to Z and a to z
        65=>A           97=>a
        66=>B           98=>b
        67=>C           99=>c
        68=>D           100=>d
        69=>E           101=>e
        70=>F           102=>f
        71=>G           103=>g
        72=>H           104=>h
        73=>I           105=>i
        74=>J           106=>j
        75=>K           107=>k
        76=>L           108=>l
        77=>M           109=>m
        78=>N           110=>n
        79=>O           111=>o
        80=>P           112=>p
        81=>Q           113=>q
        82=>R           114=>r
        83=>S           115=>s
        84=>T           116=>t
        85=>U           117=>u
        86=>V           118=>v
        87=>W           119=>w
        88=>X           120=>x
        89=>Y           121=>y
        90=>Z           122=>z


        i = 1   i = 2   i = 3   i = 4   i = 5   i = 6   i = 7   i = 8   i = 9   i = 10
        i = 11  i = 12  i = 13  i = 14  i = 15  i = 16  i = 17  i = 18  i = 19  i = 20
        i = 21  i = 22  i = 23  i = 24  i = 25  i = 26  i = 27  i = 28  i = 29  i = 30
        i = 31  i = 32  i = 33  i = 34  i = 35  i = 36  i = 37  i = 38  i = 39  i = 40
        i = 41  i = 42  i = 43  i = 44  i = 45  i = 46  i = 47  i = 48  i = 49  i = 50
        i = 51  i = 52  i = 53  i = 54  i = 55  i = 56  i = 57  i = 58  i = 59  i = 60
        i = 61  i = 62  i = 63  i = 64  i = 65  i = 66  i = 67  i = 68  i = 69  i = 70
        i = 71  i = 72  i = 73  i = 74  i = 75  i = 76  i = 77  i = 78  i = 79  i = 80
        i = 81  i = 82  i = 83  i = 84  i = 85  i = 86  i = 87  i = 88  i = 89  i = 90
        i = 91  i = 92  i = 93  i = 94  i = 95  i = 96  i = 97  i = 98  i = 99  i = 100


        Even number=>
i = 2   i = 4   i = 6   i = 8   i = 10  i = 12  i = 14  i = 16  i = 18  i = 20  i = 22
i = 24  i = 26  i = 28  i = 30  i = 32  i = 34  i = 36  i = 38       i = 40  i = 42  i
= 44  i = 46  i = 48  i = 50  i = 52  i = 54  i = 56  i = 58  i = 60  i = 62  i = 64  i
= 66  i = 68  i = 70  i = 72  i = 74       i = 76  i = 78  i = 80  i = 82  i = 84  i =
86  i = 88  i = 90  i = 92  i = 94  i = 96  i = 98  i = 100

        odd number=>
i = 1   i = 3   i = 5   i = 7   i = 9   i = 11  i = 13  i = 15  i = 17  i = 19  i = 21
i = 23  i = 25  i = 27  i = 29  i = 31  i = 33  i = 35  i = 37       i = 39  i = 41  i
= 43  i = 45  i = 47  i = 49  i = 51  i = 53  i = 55  i = 57  i = 59  i = 61  i = 63  i
= 65  i = 67  i = 69  i = 71  i = 73       i = 75  i = 77  i = 79  i = 81  i = 83  i =
85  i = 87  i = 89  i = 91  i = 93  i = 95  i = 97  i = 99
```

MATRIX Programs:

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
#define MAX 20
#define MORE 50

void print_matrix(int m[MAX][MAX], int r, int c);
void tra_matrix(int m[MAX][MAX], int r, int c);
void matrix_sum(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c);
void matrix_sub(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c);
void matrix_mul(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c);
void matrix_row_col_sum(int[MAX][MAX], int, int);
void magic_matrix(int[MAX][MAX], int, int);
int menu();

int main() {
   int matrix[MAX][MAX], m2[MAX][MAX], i, j, r, c;
   char name[MAX][MORE];
   // clrscr();

   do {
      switch (menu()) {
      case 0: exit(1);
      case 1:
         printf("\n\t Enter row and column: ");
         scanf("%d %d", &r, &c);
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &matrix[i][j]);
            }
         print_matrix(matrix, r, c);
         break;
      case 2:
         printf("\n\t Enter row and column: ");
         scanf("%d %d", &r, &c);
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &matrix[i][j]);
            }
         print_matrix(matrix, r, c);
         printf("\t-----------------------\n");
         tra_matrix(matrix, r, c);
         break;
      case 3:
         printf("\n\t Enter row and column: ");
         scanf("%d %d", &r, &c);
```

```
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &matrix[i][j]);
            }
         printf("\n\n\tSecond matrix\n");
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &m2[i][j]);
            }
         matrix_sum(matrix, m2, r, c);
         break;
      case 4:
         printf("\n\t Enter row and column: ");
         scanf("%d %d", &r, &c);
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &matrix[i][j]);
            }
         printf("\n\n\tSecond matrix\n");
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &m2[i][j]);
            }
         matrix_sub(matrix, m2, r, c);
         break;
      case 5:
         printf("\n\t Enter row and column: ");
         scanf("%d %d", &r, &c);
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &matrix[i][j]);
            }
         printf("\n\n\tSecond matrix\n");
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &m2[i][j]);
            }
         matrix_mul(matrix, m2, r, c);
         break;
      case 6:
         printf("\n\t Enter row and column: ");
         scanf("%d %d", &r, &c);
         for (i = 0;i < r;i++)
            for (j = 0;j < c;j++) {
               printf("\tEnter value of matrix[%d][%d]: ", i, j);
               scanf("%d", &matrix[i][j]);
            }
         matrix_row_col_sum(matrix, r, c);
```

```
            break;
         case 7:
            printf("\n\t Enter row and column: ");
            scanf("%d %d", &r, &c);
            for (i = 0;i < r;i++)
               for (j = 0;j < c;j++) {
                  printf("\tEnter value of matrix[%d][%d]: ", i, j);
                  scanf("%d", &matrix[i][j]);
               }
            magic_matrix(matrix, r, c);
            break;
         }
      } while (1);
}

void print_matrix(int m[MAX][MAX], int r, int c) {
   int i, j;
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         printf("\t%d", m[i][j]);
      }
      printf("\n");
   }
}
void tra_matrix(int m[MAX][MAX], int r, int c) {
   int i, j, tm[MAX][MAX];
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         tm[i][j] = m[j][i];
         printf("\t%d", tm[i][j]);
      }
      printf("\n");
   }
}
void matrix_sum(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c) {
   int i, j, s = 0;
   print_matrix(m1, r, c);
   printf("\t-----------------------\n");
   print_matrix(m2, r, c);
   printf("\t-----------------------\n");
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         s = m1[i][j] + m2[i][j];
         printf("\t%d", s);
      }
      printf("\n");
   }
}
void matrix_sub(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c) {
   int i, j, s = 0;
   print_matrix(m1, r, c);
   printf("\t-----------------------\n");
   print_matrix(m2, r, c);
   printf("\t-----------------------\n");
```

```
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         s = m1[i][j] - m2[i][j];
         printf("\t%d", s);
      }
      printf("\n");
   }
}
void matrix_mul(int m1[MAX][MAX], int m2[MAX][MAX], int r, int c) {
   int i, j, k, s;
   print_matrix(m1, r, c);
   printf("\t------------------------\n");
   print_matrix(m2, r, c);
   printf("\t------------------------\n");
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         s = 0;
         for (k = 0;k < r;k++) { // or k<c; because r=c
            s += m1[i][k] * m2[k][j];
         }
         printf("\t%d", s);
      }
      printf("\n");
   }
}
void matrix_row_col_sum(int m[MAX][MAX], int r, int c) {
   int i, j, sc = 0, sr[MAX] = { 0 }, total = 0;
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         sc += m[i][j];
         sr[j] += m[i][j];
         printf("\t%d", m[i][j]);
      }
      printf("\t:%d\n", sc);
      total += sc;
      sc = 0;
   }
   for (i = 0;i < r;i++) {
      total += sr[i];
      printf("\t:%d", sr[i]);
   }
   printf("\t:%d\n", total);
}
void magic_matrix(int m[MAX][MAX], int r, int c) {
   int i, j, sc = 0, sr[MAX] = { 0 }, sx = 0, sy = 0, n = r - 1;
   printf("\t------------------------\n");
   printf("\tMagic matrix: \n");
   for (i = 0;i < r;i++) {
      for (j = 0;j < c;j++) {
         sc += m[i][j];
         sr[j] += m[i][j];
         printf("\t%d", m[i][j]);
         if (i == j) { sx += m[i][j]; }
         if (i == n) { sy += m[i][j]; }
```

```
      }
      printf("\t:%d\n", sc);
      sc = 0;
      n--;
   }
   for (i = 0;i < r;i++) {
      printf("\t:%d", sr[i]);
   }
   printf("\n\n\tsum of sx=%d\n\tsum of sy=%d\n", sx, sy);
}

void name_sort(char name[MAX][MORE], int r) {
   //int i;
   //char first[r];
}

int menu() {
   int x;
   printf("\n\t 0. Exit program");
   printf("\n\t 1. print matrix");
   printf("\n\t 2. row column transpose matrix");
   printf("\n\t 3. 2 matrix addition");
   printf("\n\t 4. 2 matrix subtraction");
   printf("\n\t 5. 2 matrix multiplication");
   printf("\n\t 6. matrix sum row and column");
   printf("\n\t 7. magic matrix");
   printf("\n\t Enter number: ");
   scanf("%d", &x);
   return x;
}
```

Output:

```
         0. Exit program
         1. print matrix
         2. row column transpose matrix
         3. 2 matrix addition
         4. 2 matrix subtraction
         5. 2 matrix multiplication
         6. matrix sum row and column
         7. magic matrix
         8. name sorting
         Enter number: 1

         Enter row and column: 2 2
        Enter value of matrix[0][0]: 1
        Enter value of matrix[0][1]: 2
        Enter value of matrix[1][0]: 3
        Enter value of matrix[1][1]: 4
        1       2
        3       4

         Enter number: 2
        1       2
```

```
3       4
------------------------
1       3
2       4

 Enter number: 3

 Enter row and column: 2 2
Enter value of matrix[0][0]: 1
Enter value of matrix[0][1]: 2
Enter value of matrix[1][0]: 3
Enter value of matrix[1][1]: 4

Second matrix
Enter value of matrix[0][0]: 5
Enter value of matrix[0][1]: 6
Enter value of matrix[1][0]: 7
Enter value of matrix[1][1]: 8
1       2
3       4
------------------------
5       6
7       8
------------------------
6       8
10      12
 Enter number: 4
5       6
7       8
------------------------
1       2
3       4
------------------------
4       4
4       4

 Enter number: 5
1       2
3       4
------------------------
5       6
7       8
------------------------
19      22
43      50

 Enter number: 6
1       2       :3
3       4       :7
:4      :6      :20

 Enter number: 7
------------------------
Magic matrix:
```

```
        1       2       :3
        3       4       :7
        :4      :6

        sum of sx=5
        sum of sy=0
```

String Functions:

```
#include<stdio.h>
#include<conio.h>
#include <stdlib.h>
#define MAX 30

void str_rev(char str[]);
int menu();
int str_len(char str[]);
void str_copy(char[]);
void str_concat(char[], char[]);
int str_com(char[], char[]);
int str_palindrome(char[]);
int main() {
   char str[MAX], str1[MAX], str2[MAX];
   // clrscr();

   do {
      switch (menu()) {
      case 0: exit(1);
      case 1:
         printf("\n\tEnter String: ");
         scanf("%s", str);
         str_rev(str);
         break;
      case 4:
         printf("\n\tEnter String 1: ");
         scanf(" %[^\n]", str1);
         printf("\n\tEnter String 2: ");
         scanf("%s", str2);
         str_concat(str1, str2);
         //printf("\n\t%s", strcat(str,str2));
         break;
      case 3:
         printf("\n\tEnter String 1: ");
         scanf(" %[^\n]", str1);
         printf("\n\tEnter String 2: ");
         scanf("%s", str2);
         1 == str_com(str1, str2) ? printf("\n\tBoth string is same") : printf("\n\tBoth
string are not same");
         break;
      case 2:
         printf("\n\tEnter string: ");
```

```
            scanf("%s", str);
            str_copy(str);
         case 5:
            printf("\n\tEnter string: ");
            scanf("%s", str);
            1 == str_palindrome(str) ? printf("\n\tYes, string is palindrome") :
printf("\n\tNo, string is not palindrome");
            break;
         }

      } while (1);
}

int menu() {
   int x;
   printf("\n\t 0. exit program");
   printf("\n\t 1. string reverse");
   printf("\n\t 2. copy string");
   printf("\n\t 3. compare two string");
   printf("\n\t 4. concat two string");
   printf("\n\t 5. string palindrome");
   printf("\n\t Enter number: ");
   scanf("%d", &x);
   return x;
}
void str_rev(char str[]) {
   int i, j, n;
   char temp, v[MAX];
   n = str_len(str);
   //printf("%d",n);
   for (i = 0, j = n - 1;i <= n / 2;i++, j--) {
      temp = str[i];
      str[i] = str[j];
      str[j] = temp;
   }
   printf("\n\tString reverse: %s", str);
}
int str_palindrome(char str[]) {
   int i = 0, f = 0;
   char new_str[MAX] = "";
   while (str[i] != '\0') {
      new_str[i] = str[i];
      i++;
   }
   str_rev(str);
   i = 0;
   while (str[i] != '\0') {
      if (new_str[i] == str[i]) {
         f = 1;
      }
      else {
         f = 0;
      }
      i++;
```

```
    }
    return f;
}
int str_len(char str[]) {
    int i = 0;
    while (str[i] != '\0') {
        i++;
    }
    return i;
}
void str_concat(char str1[], char str2[]) {
    int i = 0, n, m;
    n = str_len(str1);
    m = str_len(str2);
    //printf("%d",n);

    while (m >= 0) {
        m--;
        //printf("%d %d %c %c\t", n, i, str1[i], str2[i]);
        str1[n + i] = str2[i];
        i++;
    }
    printf("\n\tcopy string %s", str1);
}
void str_copy(char str[]) {
    int i = 0;
    char copy_str[MAX] = "";
    //printf("\n\t%s", str);

    //n = str_len(str);
    //printf("%d",n);
    while (str[i] != '\0') {
        copy_str[i] = str[i];
        i++;
    }
    printf("\n\tNew copy string: %s", copy_str);
}
int str_com(char str1[], char str2[]) {
    int n, m, i = 0;
    n = str_len(str1);
    m = str_len(str2);
    if (n != m) {
        return 0;
    }
    while (str1[i] != '\0') {
        if (str1[i] != str2[i]) {
            return 0;
        }
        i++;
    }
    return 1;
}
```

Output:

```
 0. exit program
 1. string reverse
 2. copy string
 3. compare two string
 4. concat two string
 5. string palindrome
 Enter number: 1

Enter String: Vishal

 Enter number: 2

 Enter string: vishal

New copy string: vishal

 Enter number: 3

Enter String 1: any

Enter String 2: any

Both string is same

 Enter number: 4

Enter String 1: Hey

Enter String 2: There

copy string HeyThere

 Enter number: 5

Enter string: nayan

String reverse: nayan
Yes, string is palindrome
```

Structure:

```c
#include<stdio.h>
#include<conio.h>

struct emp {
   int id;
   char name[40];
   double salary, hra, da, pf, gross;
}e;

void print_struct(struct emp);

int main() {
   //struct std s1;
```

```
    //int n;
    // clrscr();

    //printf("\n\tHow many employee ? : ");
    //scanf("%d", &n);

    //while(n != 0){
    printf("\n\tEnter employee name: ");
    scanf("%s", e.name);
    printf("\n\tEnter employee id: ");
    scanf("%d", &e.id);
    printf("\n\tEnter employee salary: ");
    scanf("%lf", &e.salary);
    //printf("\n\t%d,\t%s,\t%lf", e.id, e.name, e.salary);

    print_struct(e);
    //n--;
    //}

    getch();
    return 0;
}

void print_struct(struct emp e) {
    e.hra = e.salary * 0.10;
    e.da = e.salary * 0.08;
    e.pf = e.salary * 0.12;
    e.gross = e.salary + e.hra + e.da - e.pf;
    printf("\n\tid\tname\tsalary\t\thra\t\tda\t\tpf\t\tgross salary");
    //printf("\n\t%.lf",e.pf);
    printf("\n\t%d\t%s\t%.2lf\t%.2lf\t%.2lf\t%.2lf\t%.2lf", e.id, e.name, e.salary, e.hra,
e.da, e.pf, e.gross);
}
```

Output:

```
        Enter employee name: vishal

        Enter employee id: 08

        Enter employee salary: 987654

        id      name    salary          hra             da              pf
gross salary
        8       vishal  987654.00       98765.40        79012.32        118518.48
1046913.24
```

Structure and textcolor:

```
#include<stdio.h>
#include<conio.h>

struct product {
    int id, qty;
    char name[50];
```

```
   double price, total;
}p;

void product_info(struct product);
int main() {
   clrscr();

   printf("\n\tEnter product id: ");
   scanf("%d", &p.id);
   printf("\n\tEnter product name: ");
   scanf(" %s", p.name);
   printf("\n\tEnter product quntity: ");
   scanf("%d", &p.qty);
   printf("\n\tEnter product price: ");
   scanf("%lf", &p.price);

   product_info(p);

   getch();
   return 0;
}
void product_info(struct product p) {
   textcolor(YELLOW);
   printf("\n\tProduct information");
   printf("\n\tid\tname\tquelity\tprice\t\ttotal");
   printf("\n\t%d\t%s\t%d\t%.2lf\t%.2lf", p.id, p.name, p.qty, p.price, p.qty * p.price);
   resetcolor();
}
```

Output:

```
        Enter product id: 08

        Enter product name: Phone

        Enter product quntity: 2

        Enter product price: 13000

        Product information
        id      name    quelity price           total
        8       Phone   2       13000.00        26000.00
```

Array Structure:

```
#include<stdio.h>
#include<conio.h>

struct student {
   int roll;
   char name[40];
   int m1, m2, m3, total;
   double per;
   struct dob {
      int dd, mm, yy;
```

```
   }d;
}s[10];

void print_struct(struct student[], int);

int main() {
   struct student s1;
   int n, i;
   clrscr();

   printf("\n\tHow many student ? : ");
   scanf("%d", &n);
   for (i = 0;i < n;i++) {
      printf("\n\tEnter student %d name: ", i + 1);
      scanf(" %s", s[i].name);
      printf("\n\tEnter student %d roll number: ", i + 1);
      scanf("%d", &s[i].roll);
      printf("\n\tEnter student %d marks 1 2 3: ", i + 1);
      scanf("%d %d %d", &s[i].m1, &s[i].m2, &s[i].m3);
      printf("\n\tEnter student %d birth date [8/11/2002]: ", i + 1);
      scanf("%d/%d/%d", &s[i].d.dd, &s[i].d.mm, &s[i].d.yy);

      s[i].total = s[i].m1 + s[i].m2 + s[i].m3;
      s[i].per = s[i].total / 3.0;
   }

   print_struct(s, n);

   getch();
   return 0;
}

void print_struct(struct student s[], int n) {
   int i = 0;
   printf("\n  Name\t\tbirth date\troll\tmark1\tmark2\tmark3\ttotal\tpercentage");
   while (n != 0) {
      printf("\n  %s\t\t%d/%d/%d\t%d\t%d\t%d\t%d\t%d\t%.2lf", s[i].name, s[i].d.dd,
s[i].d.mm, s[i].d.yy, s[i].roll, s[i].m1, s[i].m2, s[i].m3, s[i].total, s[i].per);
      n--;
      i++;
   }
}
```

Output:

```
        How many student ? : 2

        Enter student 1 name: Vishal

        Enter student 1 roll number: 8

        Enter student 1 marks 1 2 3: 75 85 95

        Enter student 1 birth date [8/11/2002]: 8/11/2002
```

```
        Enter student 2 name: Nitin

        Enter student 2 roll number: 7

        Enter student 2 marks 1 2 3: 95 85 88

        Enter student 2 birth date [8/11/2002]: 11/8/2003

  Name          birth date      roll    mark1   mark2   mark3   total   percentage
  Vishal        8/11/2002       8       75      85      95      255     85.00
  Nitin         11/8/2003       7       95      85      88      268     89.33
```

Visit Link to Get That All Programs

GitHub Links: https://github.com/VishalChudasama08/MCA/tree/main/Sem-1/C_Language/C_onLaptop

Thank You