Project Report
On
"Scientific Calculator with Convertors"

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Abstract

Scientific calculators are used widely in any situation where quick access to certain mathematical functions is needed, especially those such as trigonometric functions, power, Modulus, Factorial etc. This project perspective I would have given a name and that's "**Scientific Calculator with convertors**". This Application can do normal calculation (addition, subtraction, Multiplication, division, &Percent) Scientific calculation (trigonometric functions, power, modulus, factorial etc.) and convert decimal to binary number and binary to decimal. It also can do Tax calculation.

ACKNOWLEDGEMENT

We would like to express the gratitude and appreciation to all those who gave us the possibility to make my project documentation more effective and also completed. A special thanks to my course teacher and our honorable teacher “Mr. Kaushik Sarker”, whose help, simulation and encouragement, helped us to coordinate our project specially writing this documentation.

A special thank goes to our classmate “Zillur Rahman”, who held us to assemble the parts and gave suggestion to make my project in different processes.

Our sincere thanks to our friends and colleagues who have supported our work on the project: specially, Daffodil International University’s family members, friends and brothers, Mojadded Kawsar, Md. Rifat Hossain, Taukir Hasan and also Mr. Kaushik Sarker for his valuable and important new ideas.

Our thanks also go to the Codeblocks organization for gave me the privilege to develop the project easily.

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“Scientific Calculator with Convertor”

INTRODUCTION

This report shows the design of an application that we developed. For this project perspective we would have given a name and that's "**Scientific Calculator with Convertors**". This application can calculate addition, Multiplication, division, Percent, trigonometry functions, matrix, tax calculation etc. It can convert decimal to binary number and binary to decimal.

At the beginning session we will depict the use-case diagram. We will show the graphical user interface for user and admin perspective. Behind this we will show the analyzing process for together.

While User is open this application, it want a user name and password. If the username or password is wrong it is again want a username and password. When the username and password is correct than it go to the calculator.

In calculator option we have given some menu like log out, about, normal calculator mode scientific calculator mode, and converter mode.

In normal calculator mode user can do calculate addition, subtraction, Multiplication, division, &Percent. Second option is scientific calculator. It can do Power, Modulus, Factorial sin(x), cos(x), tan(x), cosec(x), sec(x), cot(x), log(x) and Matrix. In the matrix, user can do matrix addition, matrix multiplication and matrix determinate. Third option is convertor mode. Here user can convert decimal number to binary number and binary number to decimal number. And it can do tax calculation. For tax calculation it want to know users sex, basic monthly salary, entertainment, medical, house rant, provident fund, other and announcement than it give tan tax for 1year.

SOFTWARE REQUIREMENT SPCIFICATION

When we selected this project we thought about some specific Software requirement, like as--

- Who will use this system
- Is it their reliable or not?
- Functional & Non- functional requirements
- OS & Operating Environment

Functional Requirement:

The functional requirements of the system are like below---

- Saving problem = It must have the capacity to save the giving information form the user.
- Take input = It must take input from the user. And after taking input it must show the view as well.
- Login = It must take advance login for the user.
- Logout = It must assure that one employee can't leave the institute without permission.
- Compiler = Here, we use GNU GCC compiler. And it can work at any executable environment.

Non – Functional Requirement:

The non-functional requirements are given below—

- Speed = Take a little time to execute the full program.
- Platform compatibility = Can work on any OS (operating environment) like Windows, Linux and Mac with Code Block, Turbo C etc.
- Usability = For being simple and easy coding it becomes understandable to all especially to the students. They can easily able to use this system and got best feedback.
- Backup = This system is till now under processing and for any kind of disaster attack we keep a backup of our system for recovery.

- Quality = It can be used by any level of users of DIU who needs to book bus ticket from DIU. But this system is mostly preferable for the student and members.
- Operation = It can able to save passenger's information and admin panel data.
- Update = Our system will be updated to v2.0 and more in future.
- Effectiveness = If any one give any input this system quickly execute all the data and give expected result.
- Efficiency = It can work on any platform and it can be handled easily by anyone.
- Extensibility = We can able to add any features and any more option at any time with our system.

PLAN/PROPOSE SYSTEM

In this world of growing technologies everything has been computerized. Calculator is also a computer function. This calculator can be calculate many things like addition, subtraction, Multiplication, division, Percent, trigonometry, Power, Modulus, Factorial, matrix and tax. This project simplifies the task of maintain records because of its user friendly nature

- Easy to use
- Fully customizable Fully scalable
- Take input from user
- Give proper massage
- Work in sort time

DESIGN

For this application, we designed a Use-case diagram to know the actual situation. Than we give a flowchart Let we show the diagrams and also try to show the relationships between those.

Let I show the Use-Case diagram that i used in my project perspectives. The Use-Case diagram will have containing the total overview. Whenever a client visualizes the diagram he cans precept the actual working process.

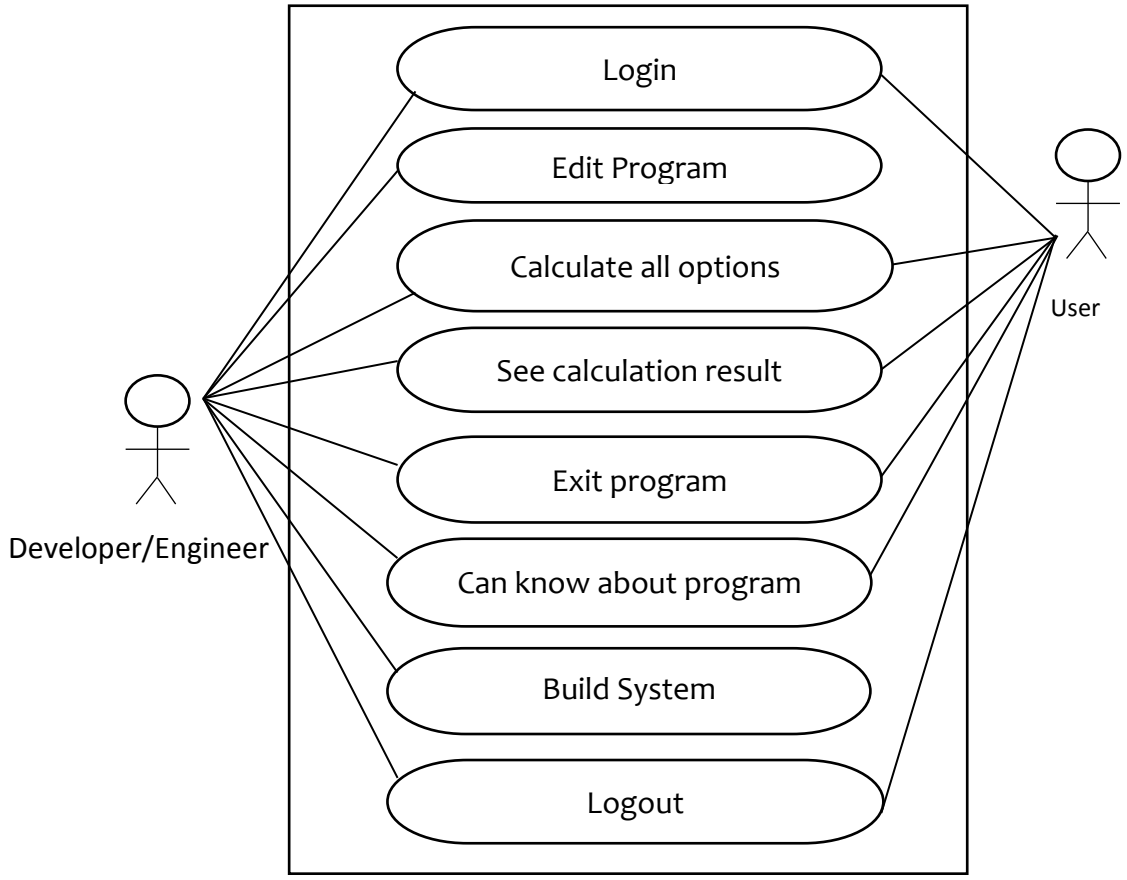


Fig 01- Overall use case diagram.

Here in this use case diagram have two actor, Developer and user. Developer can do all the activity of this program. And the user can't do all this. User can't build and edit system. User can login, logout, calculate, display calculation result, know about this program and exit program.

Flowchart: For these project perspectives we give a flowchart

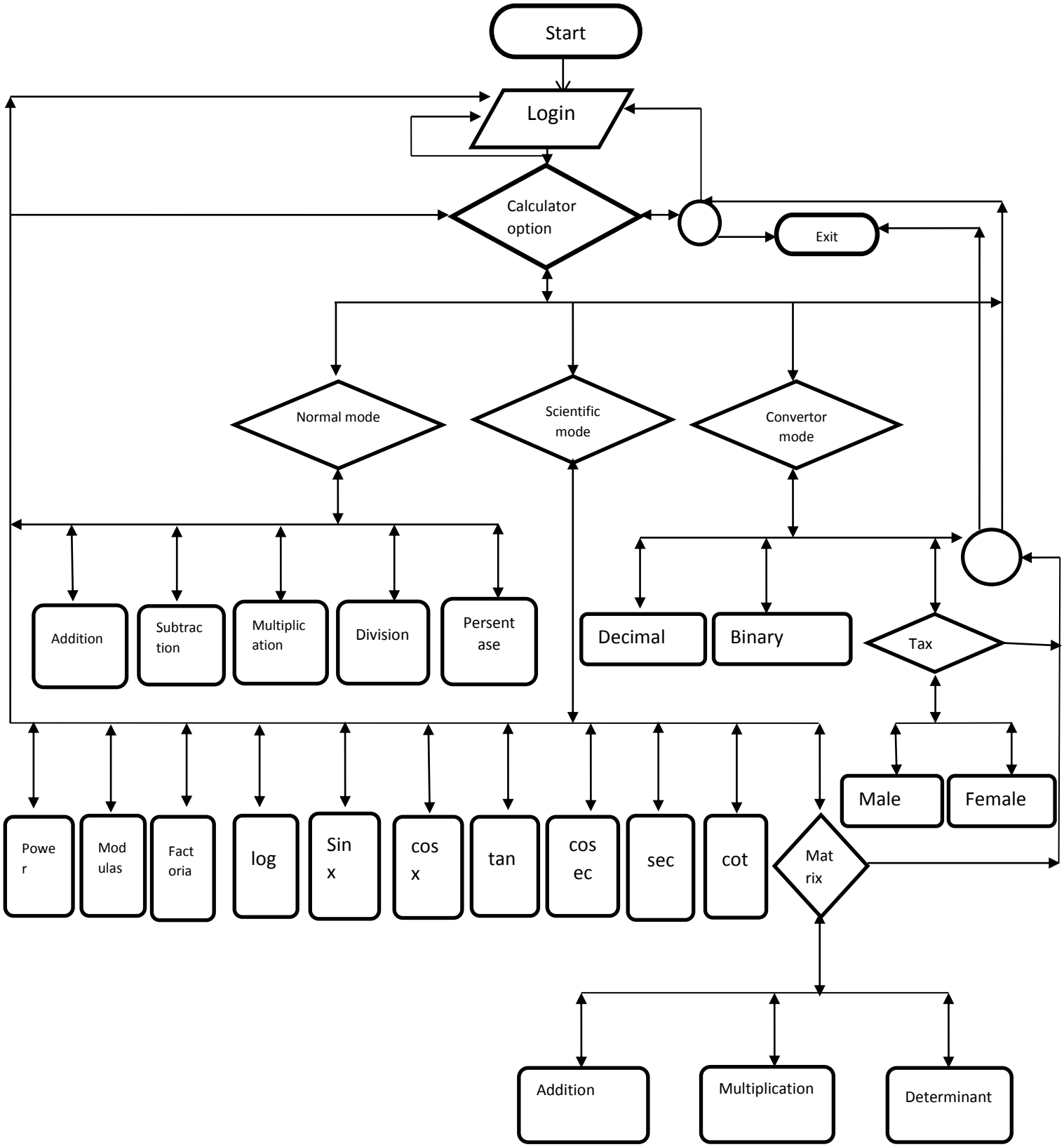


Fig 02- Flowchart

From this flowchart we any one can easily know about this project. Firstly this program is wanted to know user name and password if the username and password incorrect the program will return this page and again want username and password. When the username and password is correct than the main function of calculator will be running. Than it has 3 option Normal mode, scientific mode and converter mode. From this place user can exit or logout from program. User can also know about program from this place.

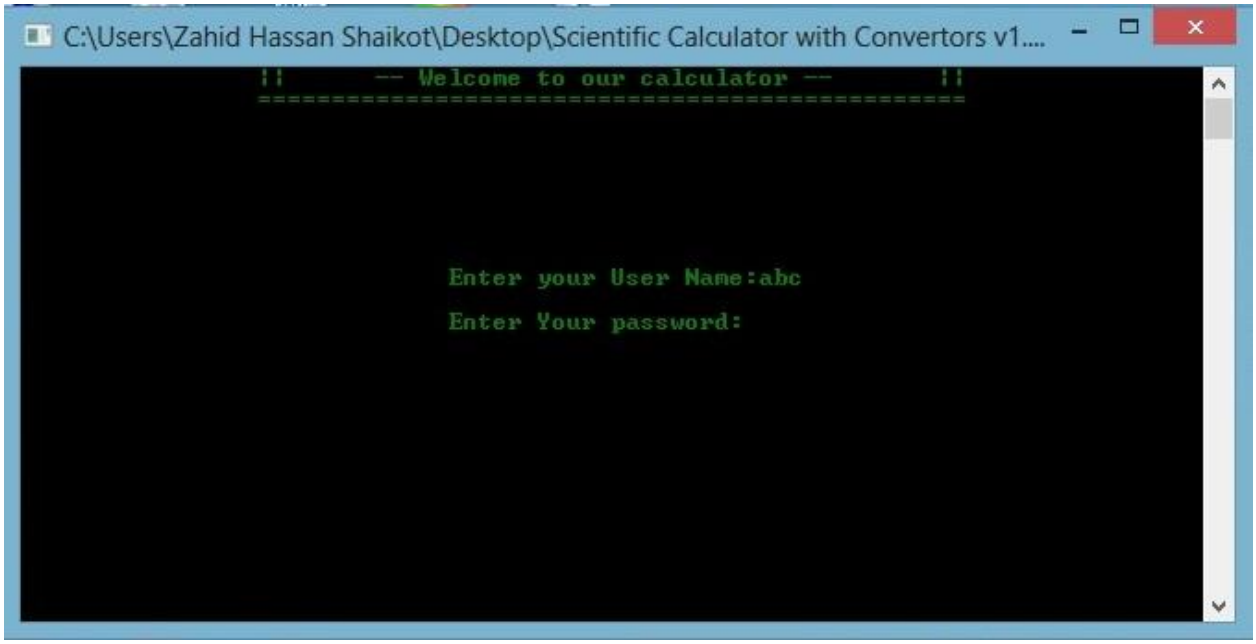
In normal mode user can do addition, subtraction, Multiplication, division, &Percent. After finish the options will return normal mode. User can return main menu, logout and exit program from this all place. And return after calculation if User wants to do.

In scientific mode user can do Power, Modulus, Factorial sin(x), cos(x), tan(x), cosec(x), sec(x), cot(x), log(x) and Matrix. All the option will return scientific mode after doing this except matrix. In matrix have 3 option matrix addition, matrix multiplication and matrix determinate.

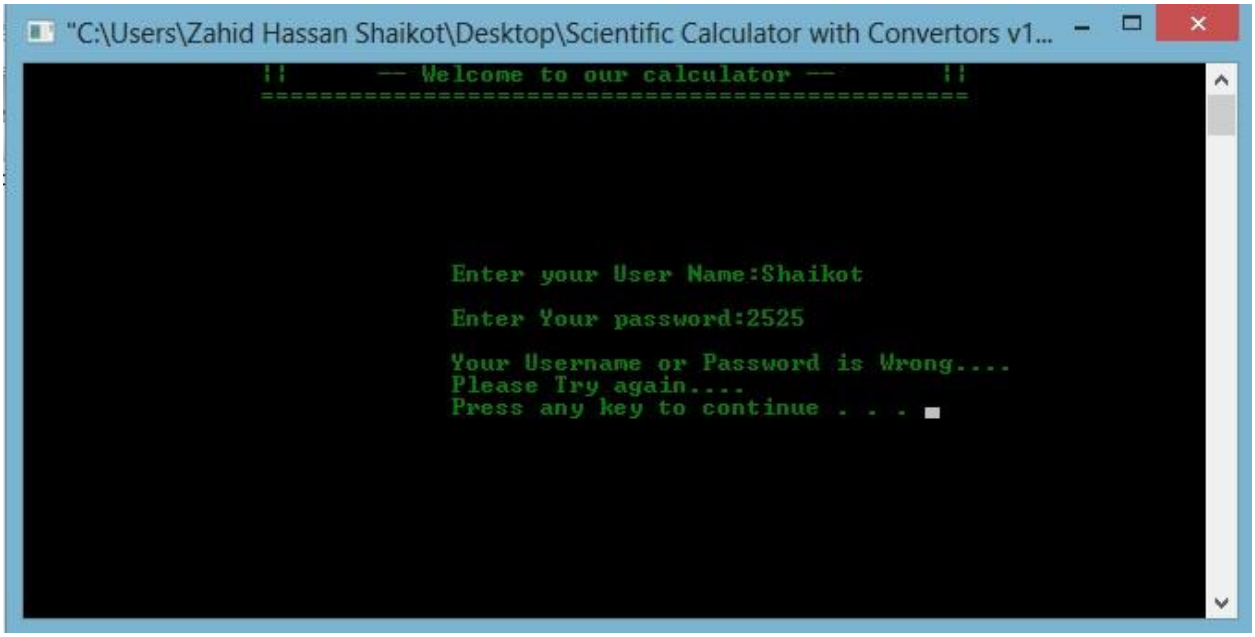
In third option convertor which has three option decimal number to binary number, binary number to decimal number and tax calculation. Here user can convert decimal number to binary number and binary number to decimal number. For tax calculation it wants to know users sex. Then it went to know basic monthly salary, entertainment, medical, house rant, provident fund, other and announcement than it give tan tax for 1 year. After calculation it returns to tax calculation mode. User can return main menu, logout and exit program from this all place. And return after calculation if User wants to do.

IMPLEMENTATION

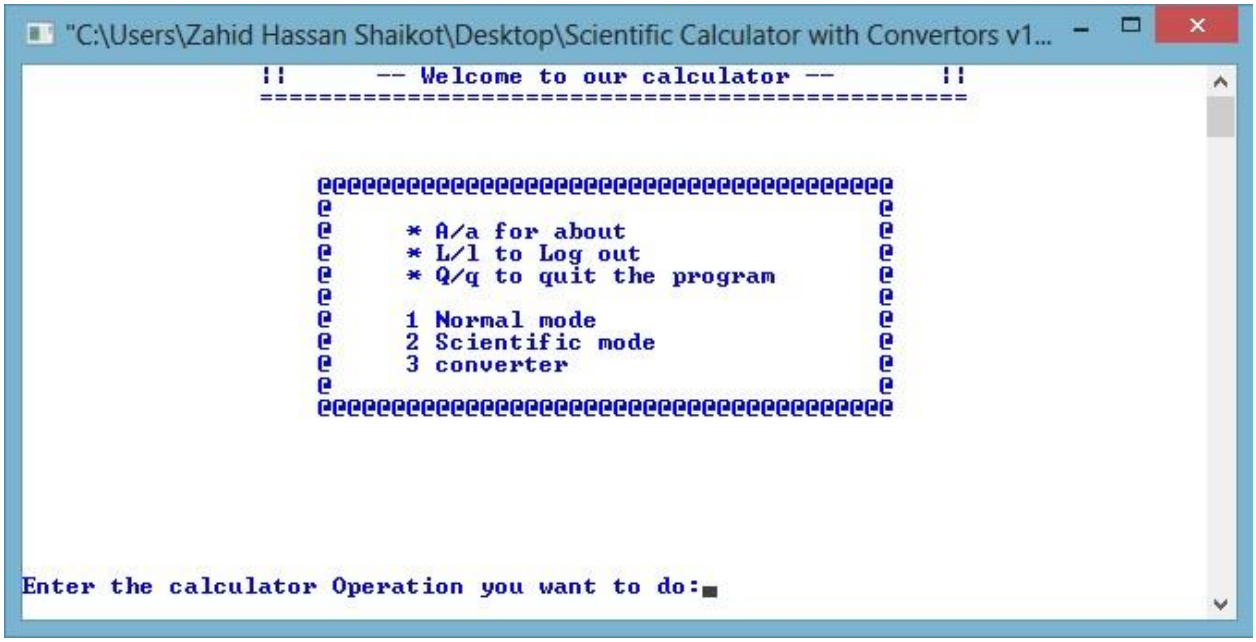
In this implementation session, we will have given some picture of this application. From this picture any one can easily know about this program. Now we show this:-



When users run this application it will want a username and a password. If it is correct than it will work in next step or it will not work.

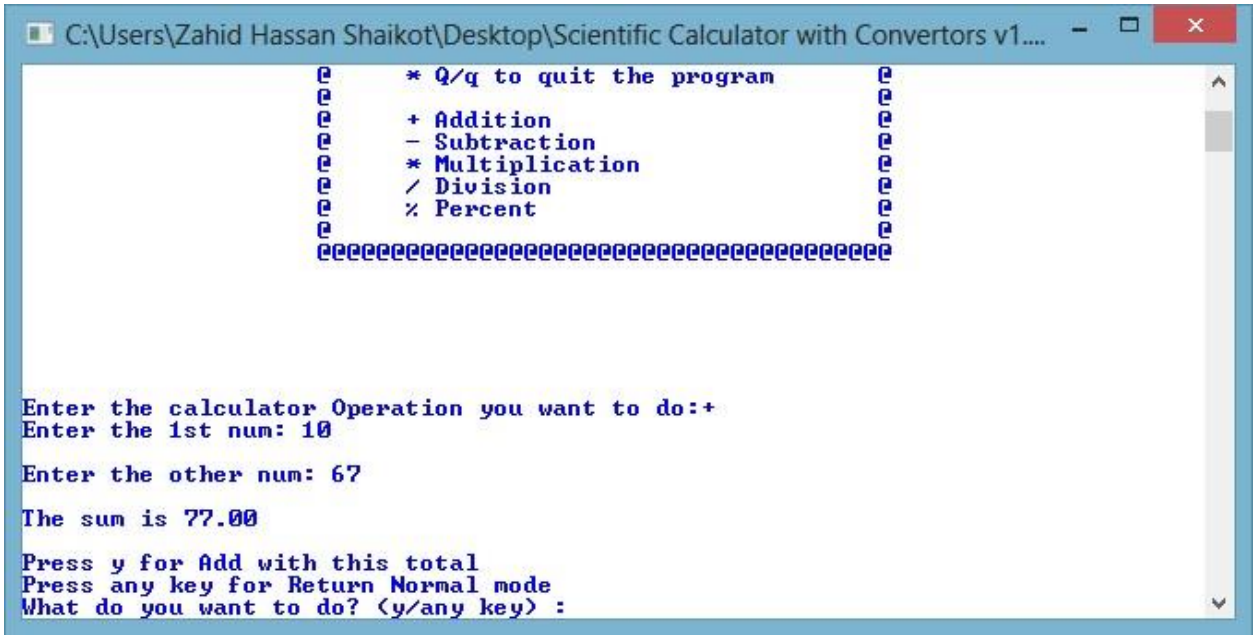


If the password or username incorrect it will back this page and again want this. And it will give a message to press any key to try again.

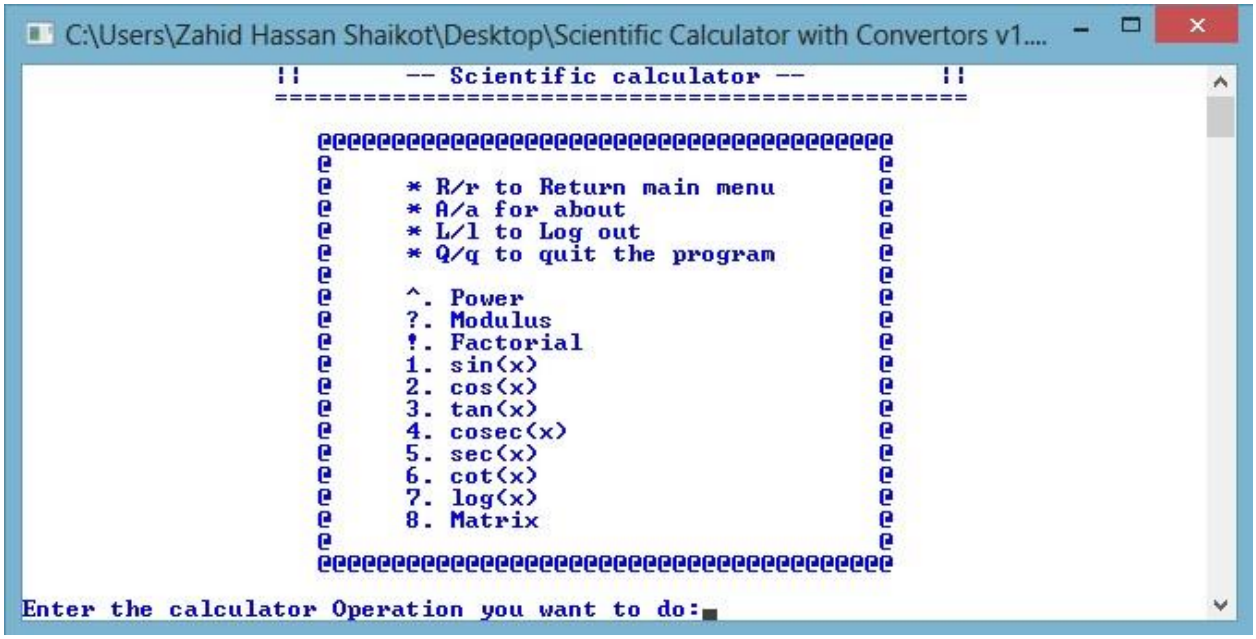


This is the main page of this application. When the user name and the password are correct then it shows this page. Here user can know about this program, logout and quit from program. Here have 3 option 1st normal mode, 2nd scientific mode and 3rd convertor. User can choose any one.

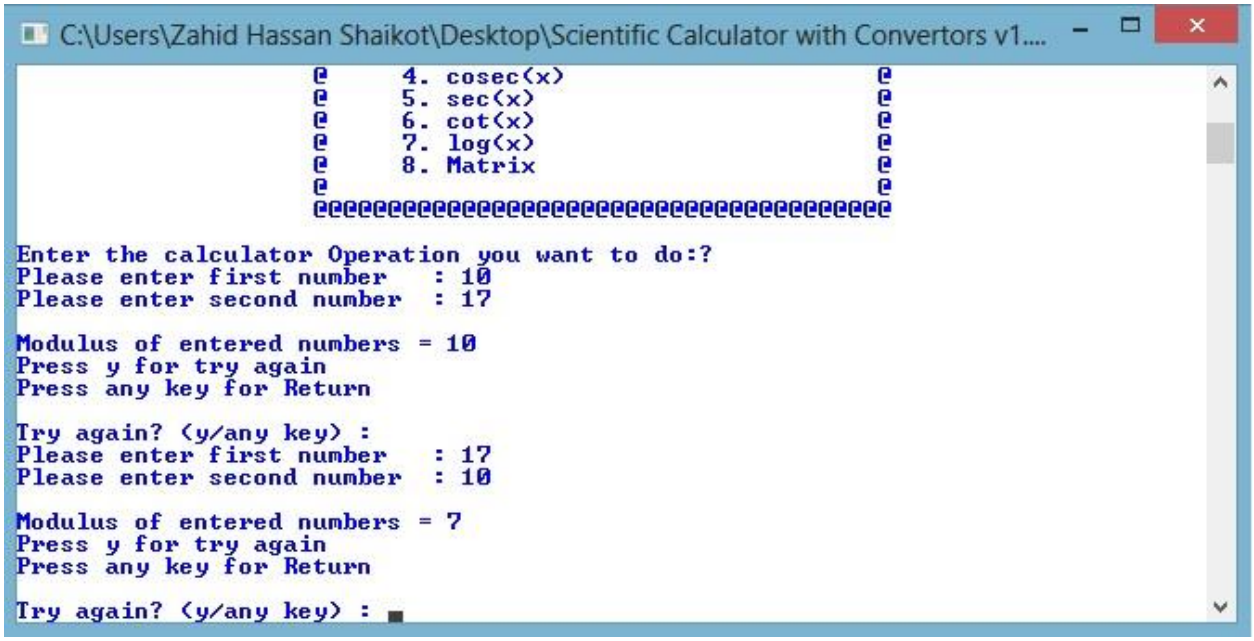
In this normal mode have 5 options, Addition, subtraction, multiplication, division and percent. Here user can know about this program, logout and quit from program. Here user also can return main page.



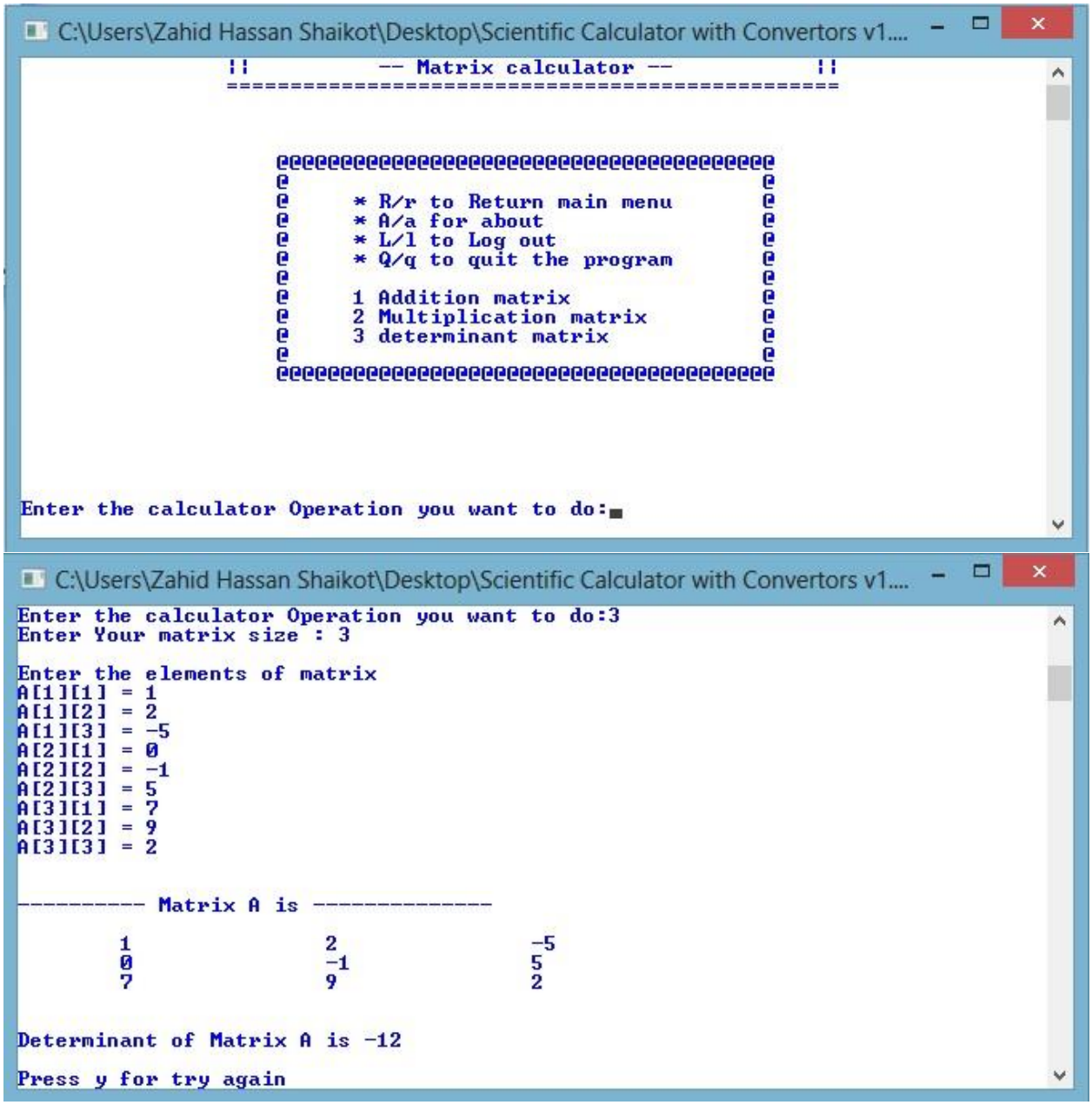
Suppose user choice to calculate addition, the application wants numbers to calculate, after the calculation user can return or can again calculate. And also can do this again.



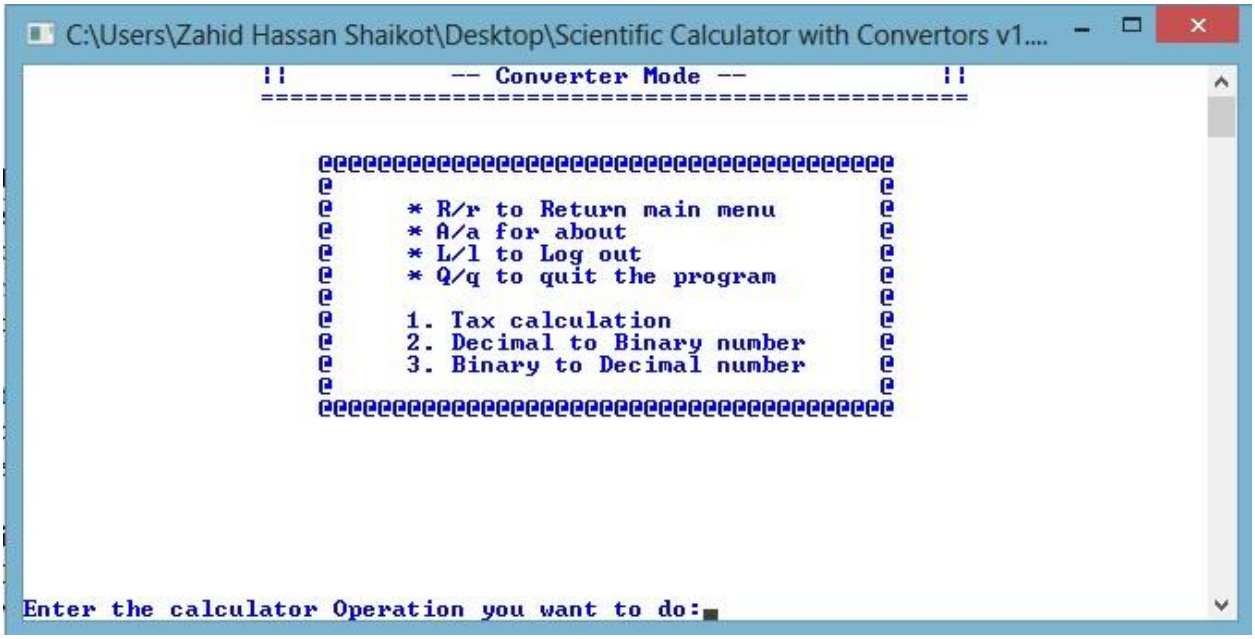
In this scientific mode, user can calculate Power, Modulus, Factorial sin(x), cos(x), tan(x), cosec(x), sec(x), cot(x), log(x) and Matrix. User can do anything from this by following the command. Here user can know about this program, logout, quit from program and return main menu.



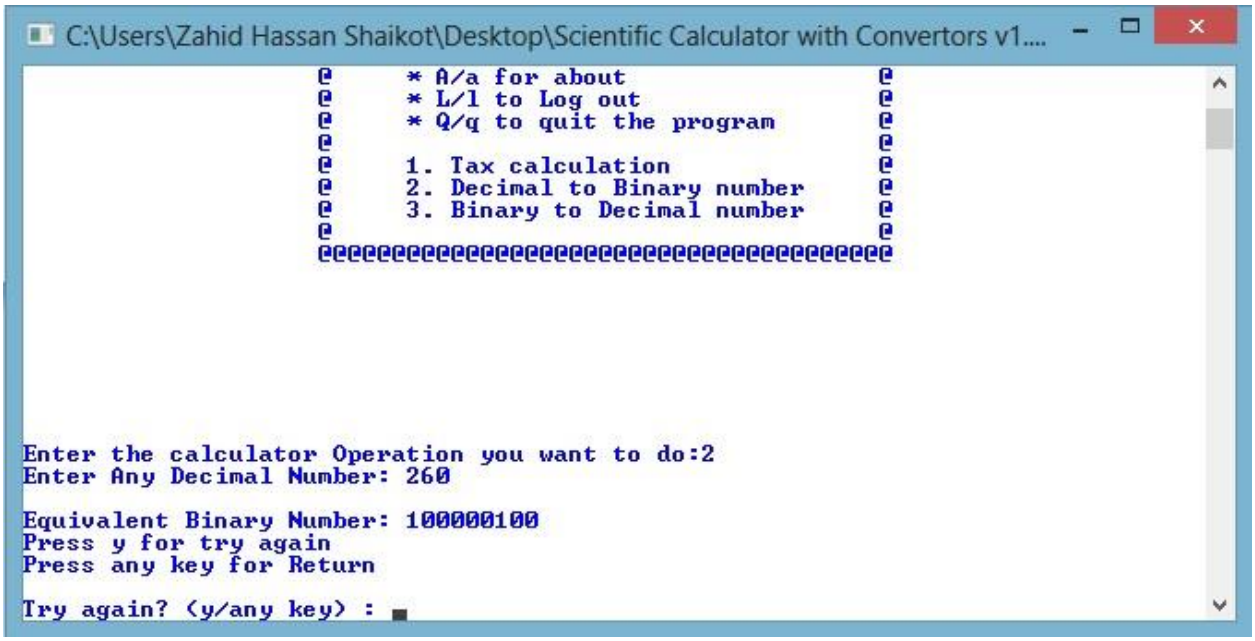
If user press '?', it will insert in modules function. The application wants numbers to calculate, after the calculation user can return or if he wants, user can again calculate.



If users press ‘8’, it will be calculation matrix addition, matrix multiplication and matrix determination. Here user can know about this program, logout, quit from program and return main menu. If user wants to calculate matrix determination, it wants to insert matrix size then the elements. After insert value, it calculates matrix determination. After the calculation if user wants, user can return or user can again calculate.



In convertor mode, user can calculate decimal to binary number, binary to decimal number and tax. Here user can know about this program, logout, quit from program and return main menu.



If user wants to convert decimal number to binary number, user would be insert decimal number and it will convert in binary number. After the calculation if user wants, user can return or user can again calculate.

If user went to calculate tax, firstly need to select user's gender. After selection gender, user's need to input his/her monthly basic salary, entertainment, medical, house rant, provident fund and other announcement. Then it will give the yearly tax able income. And finally it will give the tax for user's income. After the calculation if user wants, user can return or user can again calculate.

TEST RESULT AND DISCUSSION

This program is tested many times. Now, we are optimistic that the program will executed properly. The results of the testing are…

Testing-1: Firstly our Application has a username and password system. If user gives wrong input, it gives a message and tells to try again doing. If it is correct then it goes to the next page. This is a Strong point of our program. Expected result is come from this function.

Testing-2: After the login, here sow some option like logout, normal calculator, scientific calculator convertor etc. if user inputs wrong key it do nothing. Only move by correct key. It is also a strong point of our program.

Testing-3: If user want to do the normal calculation, here has some option and all the option are executed properly. User can return main menu from this option. This is the strong point of our application

Testing-3: In matrix Multiplication, if users give the same value of the 1^{st} matrix column and row of the 2^{nd} matrix then the program return previous menu. It should not do by this program. It is the weak point in my program.

Testing-4: There is no option to back one step from matrix calculator and tax calculator. User can back only main menu. It should be remain in this option. It is the weak point in our application.

Testing-5: In Binary to Decimal conversation, if user input wrong number (Decimal number) it show the wrong output .it should give a message and give a chance to do this again. It is a weak point in our application.

Testing-6: If user input any unexpected commend the program will return in previous page. Expected result is come from this function. This is the strong point in our application.

EVALUATION OF OUR LERNING EXPERIANCE

From making this project and report, we have learned many things. Like as…

- Declare variable and Assign values.
- Input number/ character from keyboard.
- Perform calculation using arithmetic expressions.
- Using function to return values.
- Using function arguments.
- Using if else, for loop, while, do while loop, nested loop, switch case etc.
- Use break to exit loop.
- Continue and goto statement.
- Logical operators.
- Declare one-dimensional and multidimensional arrays.
- Using strings.
- Initialize arrays and strings.
- Using pointers.
- Using functions.
- File input & output.
- String and character functions.

Before making this report, we don’t knows how to make a report. Before making this project we don’t know about tax calculation. But now we know this.

UPCOMING FEATURES

We will try to make some features in our next version. For example, show the “Unit Conversions” that’ll covert unit like inches to centimeter, centimeter to inches, feet to miter, mile to kilometer etc. We have given only al number to binary number and binary number to decimal number, in next time we will give the full number system conversation.

Here we cannot save the result for using next time. User cannot do at a time addition, Multiplication, devotion, subtraction etc. like as 5+6*(10/2).but we will try to give it in next time.

CONCLUSION

In this report, an information system's development has been presented. It was emphasized on the basic steps, consequently taken during the project's development course as a particular attention was turned to the basic operative functions performed upon the data into the database.

All phases of this project are important because any kind of mistake can damage the whole system. If there any mistake or problem whole project will be fall in problem. And documentation is the note of whole process. So document should be correct and informative. In this document we try to add correct requirement and information for the project. If our project works properly, all kinds of people of our country will get a great benefit from this. At last I will thank our honorable teacher **Kaushik Sarker** to help us in making this project.

REFERENCE

- Software Tools and Techniques by Mr. Kaushik Sarker.
- Book Teach Yourself C 3rd edition by Herbert Schildt.
- http://www.nbr-bd.org.
- http://www.cprogramming.com
- Computing in C/C++ 5th edition by Er.M. Akhteruz Zaman.

APPENDIX

Here we have given some necessary code for this project:-

Main menu for security

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

int a[20][20],m;
int determinant(int f[20][20],int a);

void addition();
void subtraction();
void multiplication();
void division();
void modulus();
void power();
void factorial();
void calculator_operations();
void persentans();
void log_calculation();
void sin_cal();
void cos_cal();
void tan_cal();
void cosec_cal();
void sec_cal();
void cot_cal();
void addition_m();
void multiplication_m();
void determinant_m();
void matrix();
void normal_mode();
void scinetific_mode();
void binary_number();
void decimal_number() ;
void Tax_calculation();
void male_tax();
void female_tax();
int mainmain();


int main()
{
system("color 2");
printf("\t\t||\t-- Welcome to our calculator --\t      ||\n");

printf("\t\t============================================== \n\n\n\n");
char usearname[80],pass[16];
```

```
int i;

printf("\n\n\n\n\t\t\t     Enter your User Name:");
gets(usearname);

printf("\n\t\t\t     Enter Your password:");
gets(pass);

if((strcmp(usearname,"abc")==0)&&(strcmp(pass,"1234")==0)){
system("cls");
mainmain();

   }
else
printf("\n\t\t\t     Your Username or Password is Wrong....");
printf("\n\t\t\t     Please Try again....\n");
printf("\t\t\t     ");
system("pause");
system("cls");
return main();

return 0;

}
```

For main option:-

```
Int mainmain()
{
system("color F9");
charCalc_oprn;

printf("\t\t||\t-- Welcome to our calculator --\t      ||\n");

printf("\t\t================================================== \n\n\n\n");


printf("\t\t
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@\n"
       "\t\t   @\t\t\t               @\n"

       "\t\t   @     * A/a for about               @\n"
       "\t\t   @     * L/l to Log out              @\n"
       "\t\t   @     * Q/q to quit the program       @\n"
       "\t\t   @\t\t\t               @\n"
       "\t\t   @     1 Normal mode                 @\n"
       "\t\t   @     2 Scientific mode             @\n"
       "\t\t   @     3 converter                   @\n"
       "\t\t   @\t\t\t               @\n"
```

```
        "\t\t
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@\n");

while(1)
  {

printf("\n\n\n\n\n\n\nEnter the calculator Operation you want to do:");

Calc_oprn=getche();

switch(Calc_oprn)
      {
case '1':normal_mode();break;

case '2':scinetific_mode();break;
case '3':converter();break;


case 'L':
case 'l':system("cls"); main();break;

case 'a':
case 'A':system("cls"); printf("\n\n\t\t\tScientific Calculator with Convertors
v1.0\n\t\t\tZahid Hassan
Shaikot\n\t\t\temail:Zahidhassanshaikot@gmail.com\n\t\t\tphone:01985986986\n\
n\t\t\tAbu Hasnat
Tareq\n\t\t\temail:tareq677@diu.edu.bd\n\t\t\tphone:01934234577\n\n");

system("pause");
system("cls");
returnmainmain();break;


case 'Q':
case 'q': exit(0);break;

default :system("cls");
mainmain();
      }
  }
}
```

For addition& Subtraction:-

```
void addition()
{
double num1,num2=0,num3,total;
char ch,x,c;

printf("\nEnter the 1st num: ");
```

```
scanf("%lf",&num1);

total=num1+num2;

do
      {

printf("\nEnter the other num: ");
scanf("%lf",&num3);

total=total+num3;

printf("\nThe sum is %.2lf\n\n",total);

      printf("Press y for Add with this total \nPress any key for Return Normal mode
      \n");

printf ("What do you want to do? (y/any key) : ");

      c=getch();

}while (c== 'y' || c=='Y');

system("cls");
returnnormal_mode();
}

void subtraction()
{
char c;
do
   {
double a, b;
printf("\nPlease enter first number  : ");
scanf("%lf", &a);
printf("Please enter second number : ");
scanf("%lf", &b);
printf("\nThe Subtraction is %.2lf - %.2lf = %.2lf\n", a, b,a-b);

printf("Press y for try again \nPress any key for Return \n");
printf ("What do you want to do? (y/any key) : ");
      c=getch();

}while (c== 'y' || c=='Y');

system("cls");
returnnormal_mode();
}
```

For power:-

```
void power()
```

```
{
char c;
do
   {
doublea,num, p;

printf("\nEnter number and power to find the power \nnumber: ");
scanf("%lf",&a);

printf("power : ");
scanf("%lf",&num);

      p=pow(a,num);

printf("\n%.2lf to the power %.2lf = %.2lf \n",a,num,p);

printf("Press y for try again \nPress any key for Return \n");
printf ("\nTry again? (y/any key) : ");
      c=getch();

}while (c== 'y' || c=='Y');

system("cls");
returnscinetific_mode();
}
```

For matrix Addition

```
voidaddition_m()
{
char cc;
do
   {

int m, n, c, d, first[10][10], second[10][10], sum[10][10];

printf("\n\nEnter the number of Rows and Columns(1-10) of matrix....\nEnter your
Row size :");
scanf("%d", &m);
printf("Enter your Column size:");
scanf("%d", &n);
printf("\nEnter the elements of first matrix....\n");

for (c = 0; c < m; c++){
for (d = 0; d < n; d++){
printf("A[%d][%d]=",c+1,d+1);
scanf("%d", &first[c][d]);
    }
    }

printf("\nEnter the elements of second matrix....\n");
```

```
for ( c = 0 ; c < m ; c++ ){
for ( d = 0 ; d < n ; d++ ){
printf("B[%d][%d]=",c+1,d+1);
scanf("%d", &second[c][d]);
        }
        }

for ( c = 0 ; c < m ; c++ )
for ( d = 0 ; d < n ; d++ )
sum[c][d] = first[c][d] + second[c][d];

printf("\nSum of entered matrices A+B:-\n\n");

for ( c = 0 ; c < m ; c++ )
  {
for ( d = 0 ; d < n ; d++ )
printf("\t%d", sum[c][d]);

printf("\n");

  }

printf("\nPress y for try again \nPress any key for Return \n");
printf ("\nTry again? (y/any key) : ");
     cc=getch();

}while (cc== 'y' || cc=='Y');

system("cls");
return matrix();
  }
```

Convert Decimal to binary number:-

```
voidbinary_number()
{
char c;
do
  {
longintdN,rem,qu;
intbN[100],i=1,j;

printf("\nEnter Any Decimal Number: ");
scanf("%ld",&dN);

qu = dN;
while(qu!=0)
     {
bN[i++]= qu % 2;
qu = qu / 2;
```

```
    }
printf("\nEquivalent Binary Number: ",dN);
for(j = i -1 ;j> 0;j--)
printf("%d",bN[j]);

printf("\nPress y for try again \nPress any key for Return \n");
printf ("\nTry again? (y/any key) : ");
    c=getch();

}while (c== 'y' || c=='Y');

system("cls");
return converter();
 }
```

For tax Calculation

```
Void Tax_calculation()
 {


int X=1;
system("cls");

printf("\t\t||\t     -- Tax Calculator --          ||\n");

printf("\t\t================================================== \n\n\n");


printf("\t\t
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@\n"
        "\t\t   @\t\t\t               @\n"
        "\t\t   @     * R/r to Return main menu      @\n"
        "\t\t   @     * A/a for about               @\n"
        "\t\t   @     * L/l to Log out              @\n"
        "\t\t   @     * Q/q to quit the program      @\n"
        "\t\t   @\t                            @\n"
"\t\t   @     1. Male                      @\n"
"\t\t   @     2. Female                     @\n"

        "\t\t   @\t                            @\n"
        "\t\t
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@\n");


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

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

charCalc_oprn;

while(X)
   {

printf("\n\n\n\nEnter your gender :");

Calc_oprn=getche();

switch(Calc_oprn)
      {
case '1':male_tax();break;
case '2':female_tax();break;

case 'r':
case 'R':system("cls"); mainmain();break;

case 'a':
          case 'A':system("cls"); printf("\n\n\t\t\tScientific Calculator with Convertors
          v1.0\n\t\t\tZahid Hassan
          Shaikot\n\t\t\temail:Zahidhassanshaikot@gmail.com\n\t\t\tphone:0198598
          6986\n\n\t\t\tAbu Hasnat
          Tareq\n\t\t\temail:tareq677@diu.edu.bd\n\t\t\tphone:01934234577\n\n");

system("pause");
system("cls");
returnmainmain();break;


case 'L':
case 'l':system("cls"); main();break;


case 'Q':
case 'q': exit(0);break;

default : system("cls");
returnTax_calculation();
      }
   }
}

Void male_tax()
{

char c;

do
   {
```

```
        double
m,a,b,r,i,j,k,l,n,o,p,entartainmant,medical,house,fund,othars,house_f,medical_f;

printf ("\nEnter all amount for manthly.if you have no amount give it 0 \nManthly
basic sellary: ");
scanf ("%lf",&m);

printf("Entertainment: ");
scanf("%lf",&entartainmant);

printf("Medical :");
scanf("%lf",&medical);

printf("House rant :");
scanf("%lf",&house);

printf("Provident fund :");
scanf("%lf",&fund);

printf("Other announcement :");
scanf("%lf",&othars);

if(house>6000){
house_f=house-6000;
        }
Else house_f=0;

If (medical>6000){
medical_f=medical-6000;
        }
Else medical_f=0;


a=(m*14)+(entartainmant*12)+(medical_f*12)+(house_f*12)+(othars*12)+(fund*12
);

printf ("\nYour Tex able income :%.2lf\n",a);

if(a < 220000)
        {
printf("No Tax");
        }
else if(a <= 520000)
        {
           r = a - 220000;
           r = r * .10;
printf("\nYour Tax is: %.2lf", r);

        }
else if(a <= 920000)
```

```
        {
           r = a -220000;
           i = r - 300000;
           i = i * .15;
           j = 300000*.10;

printf("\nYour Tax is: %.2lf",i+j);

        }
else if(a <= 1420000)
        {
           r = a -220000;
           i = r - 300000;
           j = i -400000;
           k=300000*.10;
           l=400000*.15;
           j=j * .2;

printf("\nYour Tax is: %.2lf",k+l+j);

        }
else if(a <= 4420000)
        {
           r = a -220000;
           i = r - 300000;
           j = i -400000;
           l=j-500000;
           n=300000*.1;
           o=400000*.15;
           p=500000*.20;
           l=l*.25;
printf("\nYour Tax is: %.2lf",n+o+p+l);
        }

else if(a > 4420000)
        {
           r = a -220000;
           i = r - 300000;
           j = i -400000;
           l=j-500000;
           b=l-3000000;
           n=300000*.1;
           o=400000*.15;
           p=500000*.20;
           l=3000000*.25;
           b=b*.3;
printf("\nYour Tax for one year is: %.2lf\n",b+n+o+p+l);
        }
printf("\nPress y for try again \nPress any key for Return \n");
printf ("\nTry again? (y/any key) : ");
      c=getch();
```

```
}while (c== 'y' || c=='Y');


system("cls");
return converter();


}
```