

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

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C PROGRAMMING LAB RECORD

Submitted by

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Under the Guidance of
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in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
INFORMATION SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING

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B.M.S. COLLEGE OF ENGINEERING
DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING



DECALARATION

I, Nitya Seetaraman, student of 2nd Semester, B.E, Department of Information Science and Engineering, B. M. S. College of Engineering, Bangalore, hereby declare that, this laboratory work for "C Programming" course has been carried out by us under the guidance of Prof. Rekha G S, Assistant Professor, Department of CSE, B. M. S. College of Engineering, Bangalore during the academic semester April-2021-June-2021

We also declare that to the best of our knowledge and belief, the development reported here is not from part of any other report by any other students.

NITYA SEETARAMAN (1BM20IS091)

Q1) Develop a C program to convert degrees Fahrenheit into degrees celsius.

```
#include <stdio.h>
int main()
{
    float celsius,fahrenheit;
    printf("\nEnter temperature in Fahrenheit:");
    scanf("%f",&fahrenheit);
    celsius=(fahrenheit - 32)*5/9;
    printf("\nCelsius = %.3f", celsius);
}
```

Q1 OUTPUT:

The screenshot shows the Code::Blocks IDE interface. The main window displays the output of a program named 'CtoF.exe'. The output window shows the following text:

```
Enter temperature in Fahrenheit:102
Celsius = 38.889
Process returned 0 (0x0) execution time : 15.386 s
Press any key to continue.
```

Below the output window, the 'Logs & others' panel shows build logs:

```
File Line Message
==== ====
==== Build file: "no target" in "no project" (compiler: unknown) ===
==== Build finished: 0 error(s), 0 warning(s) (0 minute(s), 4 second(s)) ===
```

The system tray at the bottom right shows the date and time as 15-07-2021 20:53.

Q2) Develop a C program to find the area of a triangle given its sides as input using functions.

```
#include <stdio.h>
#include <math.h>
int area(int a,int b, int c);
int main()
{
    int a1, b1, c1, area1;

    printf("Enter the sides of the triangle: ");
    scanf("%d %d %d", &a1, &b1, &c1);
    area1 = area(a1, b1, c1);
    printf("\nArea of the triangle= %d", area1);
    return 0;
}

int area(int a,int b,int c)
{
    int s, area;
    s = (a+b+c)/2;
    area = sqrt(s*(s-a)*(s-b)*(s-c));
    return area;
}
```

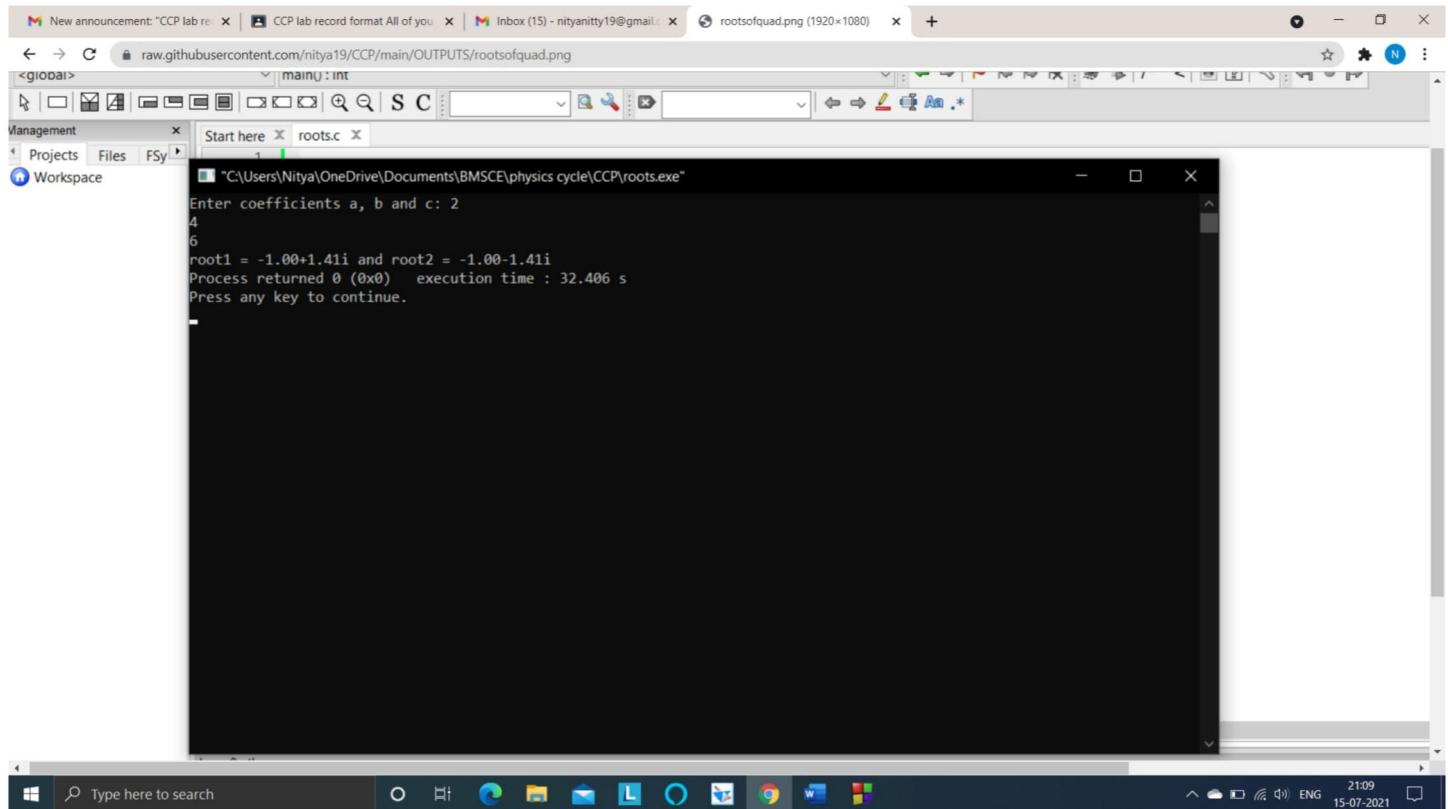
Q2 OUTPUT:

The screenshot shows the Code::Blocks IDE interface. A terminal window is open, displaying the execution of a C program named 'trianglearea.c'. The user inputs three integers: 9, 8, and 4. The program calculates the area of a triangle with these side lengths and outputs 'Area of the triangle= 10'. It also displays the process return code (0x0) and the execution time (7.885 s). The terminal window has a dark background and white text. Below the terminal, the Code::Blocks status bar shows the file path 'C:\Users\Nitya\OneDrive\Documents\BMSCe\physics cycle\CCP\trianglearea.c', the current file type 'C/C++', the encoding 'Windows (CR+LF)', the character set 'WINDOWS-1252', the line number 'Line 19', the column number 'Col 36', the position 'Pos 395', and the build configuration 'Insert'.

Q3) Develop a C program to find all possible roots of a quadratic equation.

```
#include <stdio.h>
#include <math.h>
int main()
{ double a, b, c, discriminant, r1, r2, realpt,imagpt;
printf("Enter coefficients a, b and c: ");
scanf("%lf %lf %lf", &a, &b, &c);
discriminant = b * b - 4 * a * c;
if (discriminant > 0)
{
    r1 = (-b + sqrt(discriminant)) / (2 * a);
    r2 = (-b - sqrt(discriminant)) / (2 * a);
    printf("root1 = %.2lf and root2 = %.2lf", r1,r2);
}
else if (discriminant == 0)
{
    r1 = r2 = -b / (2 * a);
    printf("root1 = root2 = %.2lf;", r1);
}
else
{realpt = -b / (2 * a);
imagpt = sqrt(-discriminant) / (2 * a);
printf("root1 = %.2lf+%.2lfi and root2
=% .2f-% .2fi",realpt, imagpt, realpt, imagpt);}
return 0;
}
```

Q3 OUTPUT:



A screenshot of a Windows desktop environment. In the center is a terminal window titled "roots.c" showing the output of a C program. The terminal window has a dark background and white text. The output is as follows:

```
"C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\roots.exe"
Enter coefficients a, b and c: 2
4
6
root1 = -1.00+1.41i and root2 = -1.00-1.41i
Process returned 0 (0x0)   execution time : 32.406 s
Press any key to continue.
```

The desktop taskbar at the bottom shows various icons for applications like File Explorer, Task View, and the Start button. The system tray indicates the date as 15-07-2021 and the time as 21:09. The overall interface is characteristic of a Windows 10 operating system.

Q4) Develop a C program to determine whether the entered character is a vowel or consonant using switch case statement.

```
#include <stdio.h>

int main()
{
    char c;
    printf("enter any alphabet: ");
    scanf("%c", &c);
    switch(c)
    {
        case 'A':
            printf("vowel");
            break;
        case 'a':
            printf("vowel");
            break;
        case 'E':
            printf("vowel");
            break;
        case 'e':
            printf("vowel");
            break;
    }
}
```

```
case 'I':  
    printf("vowel");  
    break;  
  
case 'i':  
    printf("vowel");  
    break;  
  
case 'O':  
    printf("vowel");  
    break;  
  
case 'o':  
    printf("vowel");  
    break;  
  
case 'U':  
    printf("vowel");  
    break;  
  
case 'u':  
    printf("vowel");  
    break;  
  
default:  
    printf("consonant");  
    break;  
  
return 0;  
}  
}
```

Q4 OUTPUT:

The screenshot shows the Code::Blocks 20.03 IDE interface. The main window displays a terminal-like output for a program named 'vowelorcons.c'. The output reads:

```
vowelorcons.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins Doxygen Settings Help
Management <global> "C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\vowelorcons.exe"
enter any alphabet: n
consonant
Process returned 0 (0x0) execution time : 18.373 s
Press any key to continue.
```

The bottom status bar shows the file path: C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\vowelorcons.c. The system tray indicates the date and time as 15-07-2021 21:12.

Q5) Develop a C program to print even numbers from M to N.

```
#include <stdio.h>

int main()

{
    int i,m, n;

    printf(" enter the lower limit: ");

    scanf("%d", &m);

    printf(" enter the upper limit: ");

    scanf("%d", &n);

    for(i=m; i<=n; i++)

    {

        if (i%2==0)

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

    }

}
```

Q5 OUTPUT:

The screenshot shows the Code::Blocks IDE interface. The main window displays a terminal-like output window titled "Start here". The output shows the execution of a program named "evennosMtoN.exe". The user inputs "10" and "30" as the lower and upper limits respectively. The program then prints a list of even numbers from 10 to 30. The terminal window also shows the process return code and execution time. Below the terminal, the status bar indicates the current working directory as "C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\evennosMtoN.c".

```
evennosMtoN.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Management X Start here X trianglearea.c X roots.c X vowelorcons.c X evennosMtoN.c X
Projects Files FSy...
Workspace
Management X Start here X trianglearea.c X roots.c X vowelorcons.c X evennosMtoN.c X
" "C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\evennosMtoN.exe"
enter the lower limit: 10
enter the upper limit: 30

10
12
14
16
18
20
22
24
26
28
30
Process returned 0 (0x0) execution time : 14.151 s
Press any key to continue.

Log X
Code::Blocks X Search results X Cccc X Build log X Build messages X CppCheck/Vera++ X CppCheck/Vera++ messages X Cscope X Debugger X DoxyBlocks X Fortran info X Close
File Line Message
==== Build file: "no target" in "no project" (compiler: unknown) ====
==== Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===

C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\evennosMtoN.c
C/C++ Windows (CR+LF) WINDOWS-1252 Line 1, Col 1, Pos 0 Insert Read/Write default
Type here to search 21:18
15-07-2021
```

Q6) Develop a program to calculate the sum of squares of first n odd numbers.

```
#include <stdio.h>

int main()
{
    int n,i,sum=0;
    printf(" enter the value of n: ");
    scanf("%d", &n);
    for(i=0; i<=n; i++)
    {
        if (i%2 !=0)
            sum=sum+(i*i);
    }
    printf("the sum is= %d", sum);
}
```

Q6 OUTPUT:

The screenshot shows the Code::Blocks IDE interface. The main window displays the output of a C program named 'sumofsquare.c'. The output window shows the following text:

```
sumofsquare.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins Doxygen Settings Help
Management <global> "C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\sumofsquare.exe"
enter the value of n: 10
the sum is: 165
Process returned 0 (0x0) execution time : 9.423 s
Press any key to continue.
```

Below the output window, there is a 'Logs & others' tab bar with several tabs: Code::Blocks, Search results, Ccc, Build log, Build messages, CppCheck/Vera++, CppCheck/Vera++ messages, Cscope, Debugger, Doxygen, Fortran info, and Close. The 'Build log' tab is selected, showing the following build message:

```
File Line Message
=====
==== Build file: "no target" in "no project" (compiler: unknown) ====
==== Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

The taskbar at the bottom of the screen shows the path 'C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\sumofsquare.c'. The system tray indicates the date as 15-07-2021 and the time as 21:23. The language is set to English (ENG).

Q7) Develop a program to perform addition of two Matrices.

```
#include<stdio.h>

int main()
{
    int row1, col1, row2, col2,i, j, rowsum, colsum;
    int mat1[5][5], mat2[5][5], sum[5][5];
    printf("Enter the number of rows in the first
matrix: ");
    scanf("%d", &row1);
    printf("Enter the number of cols in the first
matrix: ");
    scanf("%d", &col1);
    printf("Enter the number of rows in the second
matrix: ");
    scanf("%d", &row2); //2
    printf("Enter the number of cols in the second
matrix: ");
    scanf("%d", &col2); //2
    if(row1 != row2 || col1 != col2)
    {
        printf ("\n The number of rows and cols of both
the matrices should be same ");
        return(0);
    }
    rowsum=row1;
    colsum=col1;
```

```
printf("\n Elements of first matrix: ");

for (i=0; i<row1; i++)
    for (j= 0; j < col1; j++)
        scanf("%d", &mat1[i][j]);

printf("\n Elements of second matrix: ");

for (i= 0; i< row2; i++)
    for (j= 0; j < col2; j++)
        scanf("%d", &mat2[i][j]);

for (i= 0; i< rowsum; i++)
{
    for (j= 0; j < colsum; j++)
    {
        sum[i][j] = mat1[i][j] + mat2[i][j];
    }
}

printf("\n Sum of entered matrices : ");

for (i= 0; i < rowsum; i++)
{
    printf("\n");
    for (j = 0; j < colsum; j++)
        printf("%d\t", sum[i][j]);
}

return 0;
}
```

Q7 OUTPUT:

The screenshot shows the Code::Blocks IDE interface. The top menu bar includes File, Edit, View, Search, Project, Build, Debug, Fortran, wxSmith, Tools, Tools+, Plugins, DoxyBlocks, Settings, and Help. The toolbar contains various icons for file operations like Open, Save, Print, and Build. The main workspace shows a terminal window titled "Start here" running the program "C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\additionof2matrix.c". The terminal output is as follows:

```
Enter the number of rows in the first matrix: 2
Enter the number of cols in the first matrix: 2
Enter the number of rows in the second matrix: 2
Enter the number of cols in the second matrix: 2

Elements of first matrix:
2
3
4

Elements of second matrix:
2
3
4

Sum of entered matrices :
2     4
6     8
Process returned 0 (0x0)   execution time : 15.719 s
Press any key to continue.
```

Below the terminal, there is a Log window showing build messages:

```
File      Line    Message
====    =====  =====
     === Build file: "no target" in "no project" (compiler: unknown) ===
     === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

The system tray at the bottom shows the Windows Start button, a search bar, and various system icons. The date and time are listed as 28-06-2021 15:06.

Q8) Develop a C program to copy one string to another string and find its length without using built in functions.

```
#include <stdio.h>

int main()
{
    char s1[100],s2[100];
    int i=0;
    int j=0;
    printf(" enter the string: ");
    gets(s1);
    while(s1[i]!=0)
    {
        s2[i]=s1[i];
        i++;
    }
    s2[i]='\0';
    printf("the copied string is: %s", s2);
    while (s2[j]!='\0')
    {
        j=j+1;
    }
    printf("\n the length of the string is: %d", j);
}
```

Q8 OUTPUT:

The screenshot shows the Code::Blocks IDE interface. The main window displays the output of a program named 'copystring.exe'. The output text is:
enter the string: nitya
the copied string is: nitya
the length of the string is: 5
Process returned 0 (0x0) execution time : 10.521 s
Press any key to continue.

The bottom status bar shows the path C:\Users\Nitya\OneDrive\Documents\BMSCE\physics cycle\CCP\copystring.c, the compiler C/C++, encoding Windows (CR+LF), and the build status Line 1, Col 1, Pos 0, Insert, Read/Write, default.

Q9) Develop a C program to create student structure, read two student details (Student roll number, name, section, department, fees, and results i.e., total marks obtained) and print the student details who has scored the highest.

```
#include<stdio.h>

void main()
{
    struct student
    {
        int rollno;
        char name[20];
        char sec[3];
        char dept[20];
        int totalmarks;
    }student1,student2;

    printf("enter the roll number of student 1 and
student 2\n");
    scanf("%d
%d",&student1.rollno,&student2.rollno);

    printf("enter the name of student 1 and student
2\n");
    scanf("%s %s",student1.name,student2.name);

    printf("enter section of student 1 and student
2\n");
```

```
scanf("%s %s",student1.sec,student2.sec);

printf("enter the department of student 1 and
student 2\n");

scanf("%s %s",student1.dept,student2.dept);

printf("enter the total marks of student 1 and
student 2\n");

scanf("%d
%d",&student1.totalmarks,&student2.totalmarks);

printf("\n\nSTUDENT 1 DETAILS=\n");

printf("roll no=%d\n",student1.rollno);

printf("name=%s\n",student1.name);

printf("section=%s\n",student1.sec);

printf("department=%s\n",student1.dept);

printf("total marks=%d\n",student1.totalmarks);

printf("\n\nSTUDENT 2 DETAILS=\n");

printf("roll no=%d\n",student2.rollno);

printf("name=%s\n",student2.name);

printf("section=%s\n",student2.sec);

printf("department=%s\n",student2.dept);

printf("total marks=%d\n",student2.totalmarks);

if(student1.totalmarks>student2.totalmarks)
```

```

{ printf("student 1 got highest marks\n"); }

else

{printf("student 2 got highest marks\n");

}

}

```

Q9 OUTPUT:

The screenshot shows the Code::Blocks IDE interface with the following details:

- Title Bar:** s2.c - Code::Blocks 20.03
- Menu Bar:** File, Edit, View, Search, Project, Build, Debug, Fortran, wxSmith, Tools, Tools+, Plugins, Doxygen, Settings, Help
- Toolbar:** Standard icons for file operations.
- Code Editor:** Displays the C code and its execution output. The output window shows:

```

1 2
Enter the name of student 1 and student 2
nitya ram
enter section of student 1 and student 2
a b
enter the department of student 1 and student 2
ise cse
enter the total marks of student 1 and student 2
100 20

STUDENT 1 DETAILS=
roll no=1
name=nitya
section=a
department=ise
total marks=100

STUDENT 2 DETAILS=
roll no=2
name=ram
section=b
department=cse
total marks=20
student 1 got highest marks

Process returned 0 (0x0)   execution time : 44.827 s
Press any key to continue.

```

- Logs & others:** Shows build logs and messages. The build log output is:

```

File Line Message
*** Build file: "no target" in "no project" (compiler: unknown) ***
*** Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ***

```

- System Taskbar:** Shows the Windows taskbar with the search bar, Start button, and system tray.

Q10) Develop a C program to perform arithmetic operations (addition, subtraction, multiplication, division and remainder) on two integers using pointers.

```
#include<stdio.h>

int operations(int *, int *, int *, int *, int*, float
*, int *);

int main()
{
    int a,b;
    int add,sub,multiplication,rem;
    float division;
    printf("Enter the two numbers operations: ");
    scanf("%d %d",&a,&b);
    operations(&a, &b, &add, &sub,
    &multiplication,&division, &rem);
    printf("Addition :%d\n",add);
    printf("Subtraction :%d\n",sub);
    printf("Division :%0.2f\n",division);
    printf("Multiplication :%d\n",multiplication);
    printf("Remainder :%d\n",rem);
    return 0;
}
```

```
int operations(int *a, int *b, int *add, int *sub, int
*multiplication, float *division, int *rem)

{
    *add=*a+*b;
    *sub=*a-*b;
    *multiplication=*a**b;
    *division=(float)(*a)/(*b);
    *rem=(*a)%(*b);
    return 0;
}
```

Q10 OUTPUT:

The screenshot shows the Code::Blocks IDE interface. The main window displays the output of a program named 'pointersarithmetic.c'. The output window shows the following text:

```
pointersarithmetic.c - Code::Blocks 20.03
File "C:\Users\Nitya\OneDrive\Documents\BMSC\physics cycle\CCP\pointersarithmetic.exe"
Enter the two numbers: 12 10
<Addition :2
Subtraction :2
Division :1.20
Multiplication :120
Remainder :2
Main()
Process returned 0 (0x0) execution time : 45.875 s
Press any key to continue.
```

The code editor window shows the C code for performing arithmetic operations. The relevant part of the code is:

```
24     *division=(float) (*a) / (*b);
25     *rem=(*a)%(*b);
26     return 0;
27 }
28 }
```

The logs & others tab shows build messages:

```
File Line Message
    === Build file: "no target" in "no project" (compiler: unknown) ===
    === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

The system tray at the bottom shows the date and time as 16-07-2021 14:34.