A Micro Project Report

on

Problem Solving using C Language

Submitted by

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NARASARAOPETAENGINEERINGCOLLEGE:NARASARAOPET

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NARASARAOPETA ENGINEERING COLLEGE: NARASARAOPET

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that **Munagala Sushma**, **Roll No: 23471A05E7**, a Second Year Student of the Department of Computer Science and Engineering, has completed the Micro Project Satisfactorily in "Problem Solving using C Language" for the Academic Year 2024-2025..

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Sum of two complex

AIM:

   Write a C program to add two complex numbers.

```c
#include <stdio.h>

#include <stdlib.h>

struct Complex

 {

   float real;

   float imag;

};

struct Complex* addComplexNumbers(struct Complex* num1, struct Complex* num2)

 {

   struct Complex* result = (struct Complex*) malloc(sizeof(struct Complex));

   if (result == NULL)

{

     printf("Memory allocation failed.\n");

     exit(1);

   }
```

```c
    result->real = num1->real + num2->real;

    result->imag = num1->imag + num2->imag;

    return result;

}

int main()

{

    struct Complex *num1, *num2, *sum;

    num1 = (struct Complex*) malloc(sizeof(struct Complex));

    num2 = (struct Complex*) malloc(sizeof(struct Complex));

    if (num1 == NULL || num2 == NULL)

 {

       printf("Memory allocation failed.\n");

       exit(1);

 }

    printf("Enter real and imaginary parts of the first complex number: ");

    scanf("%f %f", &num1->real, &num1->imag);

    printf("Enter real and imaginary parts of the second complex number: ");

    scanf("%f %f", &num2->real, &num2->imag);

    sum = addComplexNumbers(num1, num2);

    printf("Sum of the complex numbers: %.2f + %.2fi\n", sum->real, sum->imag);

    free(num1);

    free(num2);

    free(sum);

    return 0;
```

}

Enter real and imaginary parts of the first complex number:3

34

Enter real and imaginary parts of the second complex number:34

6

Output:

Sum of the complex numbers:37.00+40.00i

OUTPUT:

```
Compile Result

Enter real and imaginary parts of the fir
st complex number: 3 34
Enter real and imaginary parts of the sec
ond complex number: 34
6
Sum of the complex numbers: 37.00 + 40.00
i

[Process completed - press Enter]
```

Difference of two complex numbers

AIM:

Write a C program to Subtract two complex numbers.

```c
#include <stdio.h>

struct complex
{
  int r, i;
};

int main()
{
 struct complex a, b, c;
```

```c
printf("Enter the value a and b of the first complex number (a + ib): ");

scanf("%d%d", &a.r, &a.i);

printf("Enter the value c and d of the second complex number (c + id): ");

scanf("%d%d", &b.r, &b.i);

c.r = a.r - b.r;

c.i = a.i - b.i;

if (c.i >= 0)

printf("Difference of the complex numbers = %d + %di", c.r, c.i);

else

printf("Difference of the complex numbers = %d %di", c.r, c.i);

return 0;

}
```

Input:

Enter the value of a and b of the first complex number(a+ib):5

23

Enter the value of a and b for the second complex number(a+ib):3

27

Output:

Difference of the complex numbers:2-4i

OUTPUT:

Compile Result

```
Enter the value a and b of the first comp
lex number (a + ib): 5
23
Enter the value c and d of the second com
plex number (c + id): 3
27
Difference of the complex numbers = 2 -4i
[Process completed - press Enter]
```

Product of two complex numbers

AIM:

Write a C program to multiply two complex numbers.

```c
#include <stdio.h>

struct Complex
{
   float real;
   float imag;
};

struct Complex multiplyComplex(struct Complex c1, struct Complex c2)
{
   struct Complex result;
   result.real = c1.real * c2.real - c1.imag * c2.imag;
   result.imag = c1.real * c2.imag + c1.imag * c2.real;
   return result;
}

int main()
{
   struct Complex c1, c2, result;
```

```c
    printf("Enter real and imaginary parts of the first complex number: ");

    scanf("%f %f", &c1.real, &c1.imag);

    printf("Enter real and imaginary parts of the second complex number: ");

    scanf("%f %f", &c2.real, &c2.imag);

    result = multiplyComplex(c1, c2);

    printf("Product of the complex numbers: %.2f + %.2fi\n", result.real,
result.imag);

    return 0;

}
```

Input:

Enter real and imaginary parts of first complex number:70

7.0

Enter real and imaginary parts of the second complex number:65

8.9

Output:

Product of complex numbers:4487.70+1078.00i

OUTPUT:

```
Compile Result

Enter real and imaginary parts of the fir
st complex number: 70
7.0
Enter real and imaginary parts of the sec
ond complex number: 65
8.9
Product of the complex numbers: 4487.70 +
 1078.00i

[Process completed - press Enter]
```

Sum of N complex numbers

AIM:

    Write a C program to add N complex numbers.

```c
#include <stdio.h>
#include <stdlib.h>
struct Complex
{
  float real;
  float imag;
};
struct Complex* addComplexNumbers(struct Complex* numbers, int n)
 {
 struct Complex* result = (struct Complex*) malloc(sizeof(struct Complex));
  if (result == NULL)
{
    printf("Memory allocation failed.\n");
    exit(1);
 }
   result->real = 0.0;
   result->imag = 0.0;
```

```c
    for (int i = 0; i < n; i++) {
    result->real += numbers[i].real;
    result->imag += numbers[i].imag;
  }
   return result;
 }
  int main()
{
   int n;
   printf("Enter the number of complex numbers: ");
   scanf("%d", &n);
   struct Complex* numbers = (struct Complex*) malloc(n * sizeof(struct
Complex));
   if (numbers == NULL)
{
     printf("Memory allocation failed.\n");
     exit(1);
}
   for (int i = 0; i < n; i++)
{
   printf("Enter real and imaginary parts of complex number %d: ", i + 1);
   scanf("%f %f", &numbers[i].real, &numbers[i].imag);
   }
   struct Complex* sum = addComplexNumbers(numbers, n);
   printf("Sum of the complex numbers: %.2f + %.2fi\n", sum->real, sum-
>imag);
```

```
    free(numbers);

    free(sum);

    return 0;

  }
```

Input:

Enter the number of complex numbers:3

Enter real and imaginary parts of complex number 1: 22

24

Enter real and imaginary parts of complex number 2: 5.9

93

Enter real and imaginary parts of complex numbers: 6

88

Output:

Sum of the complex numbers:33.90+205.00i

```
Compile Result

Enter the number of complex numbers: 3
Enter real and imaginary parts of complex
 number 1: 22
24
Enter real and imaginary parts of complex
 number 2: 5.9
93
Enter real and imaginary parts of complex
 number 3: 6
88
Sum of the complex numbers: 33.90 + 205.0
0i

[Process completed - press Enter]
```