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Lab Manual

SP&CG (B.Sc.(cs) & B.Com Vocational 2nd year)
Department of Computer Science

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Introduction to Computer Graphics

Computer graphics are graphics created using computers and the representation of image data by a computer specifically with help from specialized graphic hardware and software.

The interaction and understanding of computers and interpretation of data has been made easier because of computer graphics. Computer graphic development has had a significant impact on many types of media and have revolutionized animation, movies and the video game industry.

Overview and History

The term computer graphics has been used in a broad sense to describe "almost everything on computers that is not text or sound".^[1] Typically, the term *computer graphics* refers to several different things:

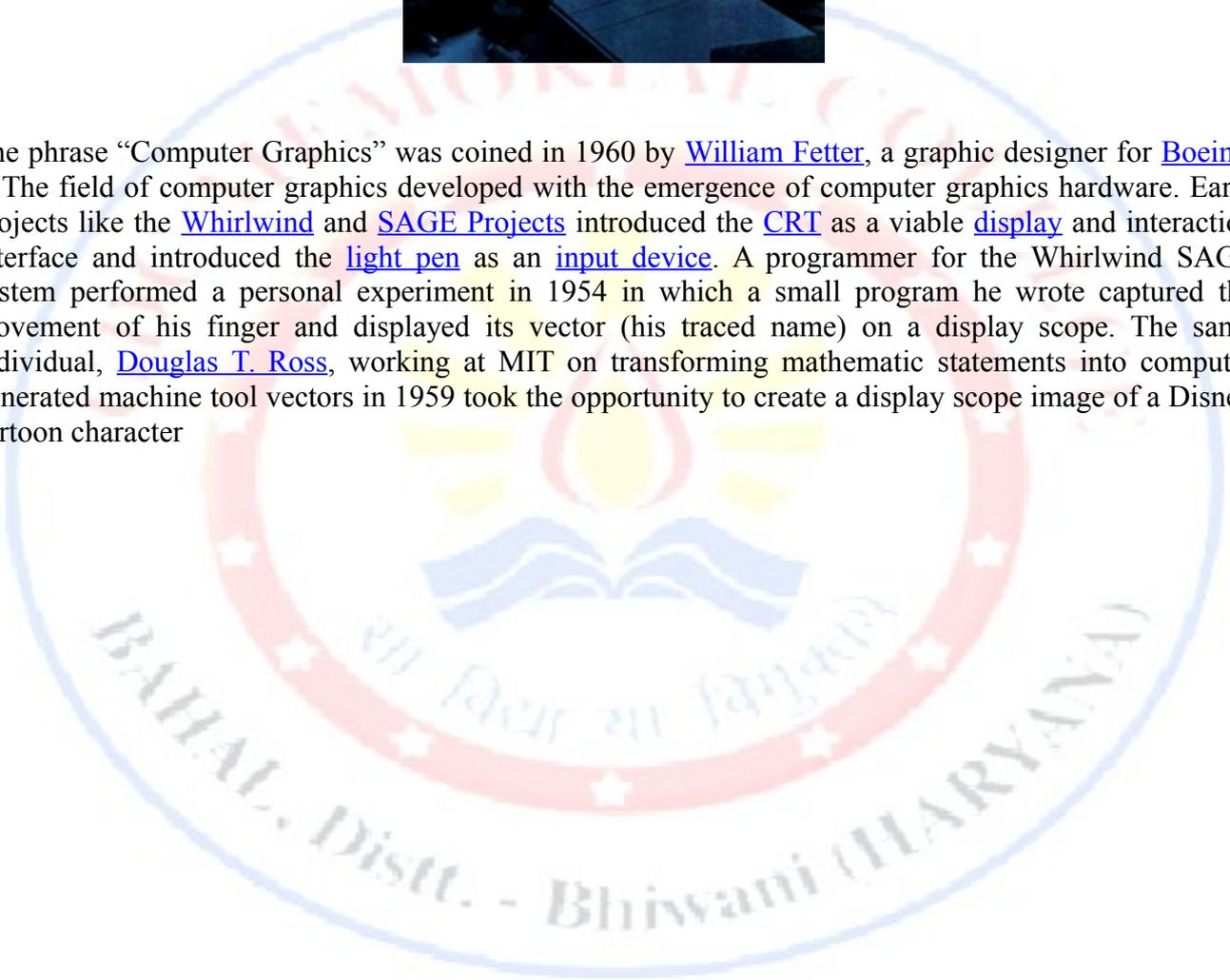
- the representation and manipulation of image data by a computer
- the various [technologies](#) used to create and manipulate images
- the sub-field of [computer science](#) which studies methods for digitally synthesizing and manipulating visual content, see [study of computer graphics](#)

Computer graphics is widespread today. Computer imagery is found on television, in newspapers, for example in weather reports, or for example in all kinds of medical investigation and surgical procedures. A well-constructed [graph](#) can present complex statistics in a form that is easier to understand and interpret. In the media "such graphs are used to illustrate papers, reports, thesis", and other presentation material.^[2]

Many powerful tools have been developed to visualize data. Computer generated imagery can be categorized into several different types: two dimensional (2D), three dimensional (3D), and animated graphics. As technology has improved, 3D computer graphics have become more common, but 2D computer graphics are still widely used. Computer graphics has emerged as a sub-field of [computer science](#) which studies methods for digitally synthesizing and manipulating visual content. Over the past decade, other specialized fields have been developed like [information visualization](#), and [scientific visualization](#) more concerned with "the visualization of [three dimensional](#) phenomena (architectural, meteorological, medical, [biological](#), etc.), where the emphasis is on realistic renderings of volumes, surfaces, illumination sources, and so forth, perhaps with a dynamic (time) component"



The phrase “Computer Graphics” was coined in 1960 by [William Fetter](#), a graphic designer for [Boeing](#).^[4] The field of computer graphics developed with the emergence of computer graphics hardware. Early projects like the [Whirlwind](#) and [SAGE Projects](#) introduced the [CRT](#) as a viable [display](#) and interaction interface and introduced the [light pen](#) as an [input device](#). A programmer for the Whirlwind SAGE system performed a personal experiment in 1954 in which a small program he wrote captured the movement of his finger and displayed its vector (his traced name) on a display scope. The same individual, [Douglas T. Ross](#), working at MIT on transforming mathematic statements into computer generated machine tool vectors in 1959 took the opportunity to create a display scope image of a Disney cartoon character

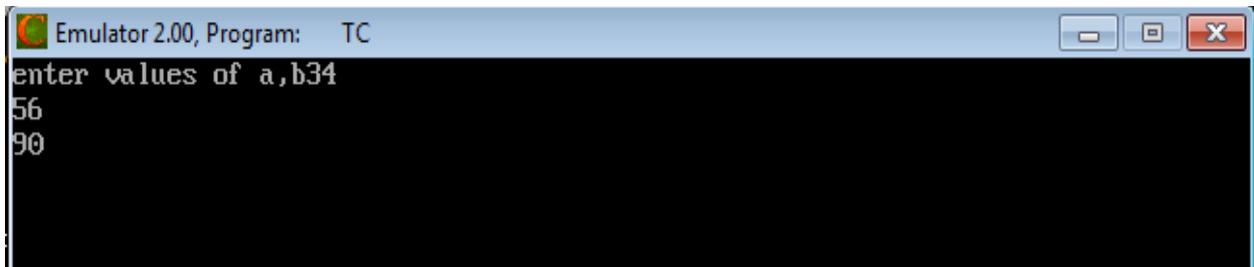


Program No.1
WAP to add two numbers.

```
#include<stdio.h>
#include<conio.h>
void main()
{
int a,b,c;
clrscr();
printf("enter values of a,b");
scanf("%d%d",&a, &b);
c=a+b;
printf("%d",c);
getch();
}
```



Output:



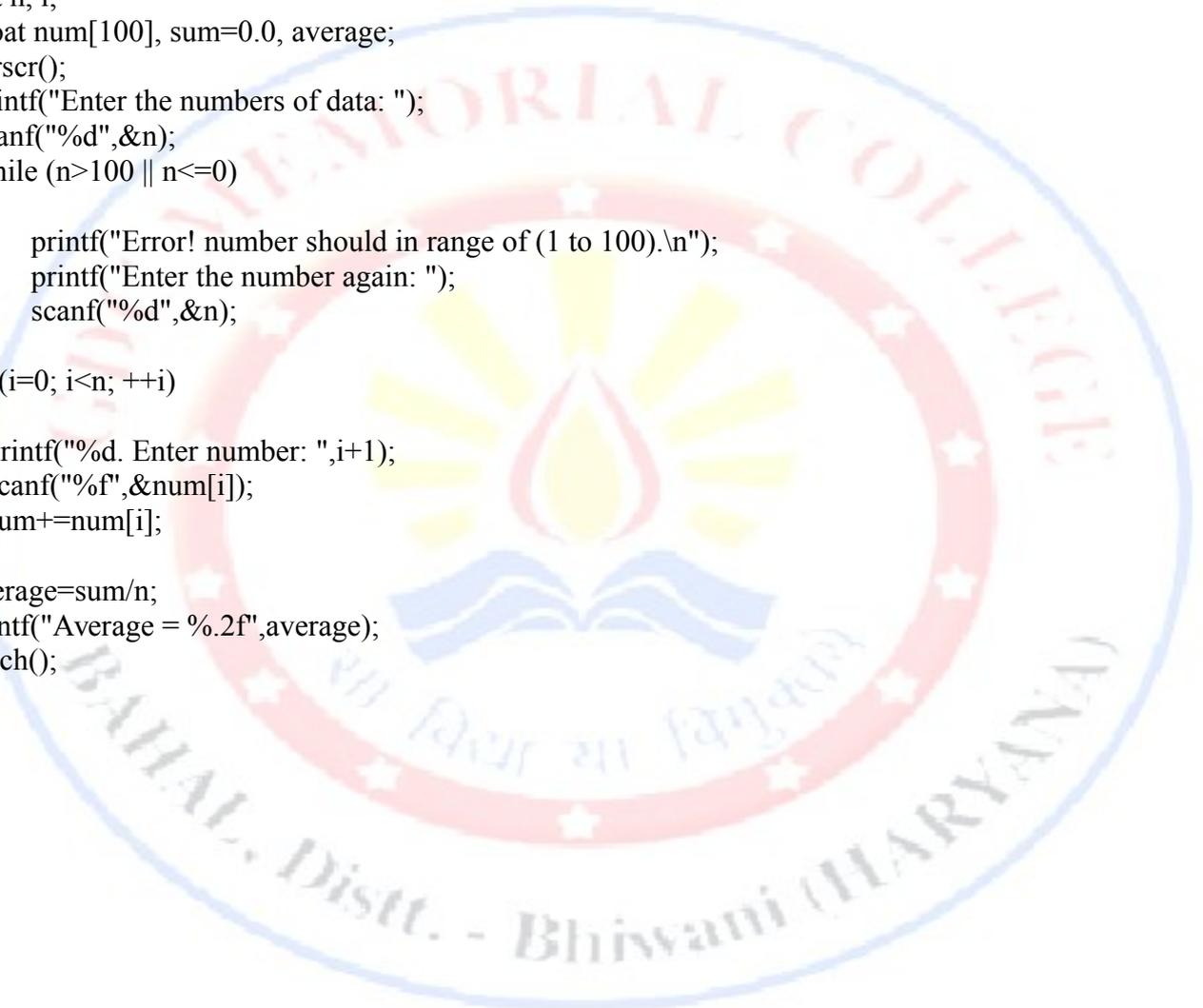
The screenshot shows a window titled "Emulator 2.00, Program: TC". The window contains the following text:

```
enter values of a,b34  
56  
90
```



Program No.2
WAP to calculate the average of n numbers.

```
#include <stdio.h>
#include <conio.h>
void main(){
    int n, i;
    float num[100], sum=0.0, average;
    clrscr();
    printf("Enter the numbers of data: ");
    scanf("%d",&n);
    while (n>100 || n<=0)
    {
        printf("Error! number should in range of (1 to 100).\n");
        printf("Enter the number again: ");
        scanf("%d",&n);
    }
    for(i=0; i<n; ++i)
    {
        printf("%d. Enter number: ",i+1);
        scanf("%f",&num[i]);
        sum+=num[i];
    }
    average=sum/n;
    printf("Average = %.2f",average);
    getch();
}
```



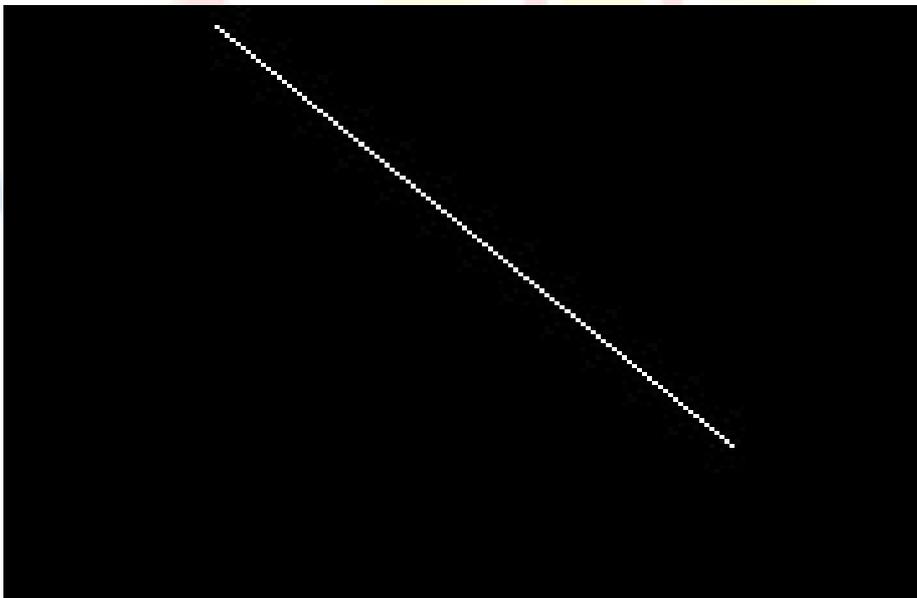
Output:

```
Emulator 2.00, Program: TC
Enter the numbers of data: 3
1. Enter number: 13
2. Enter number: 12
3. Enter number: 56
Average = 27.00
```



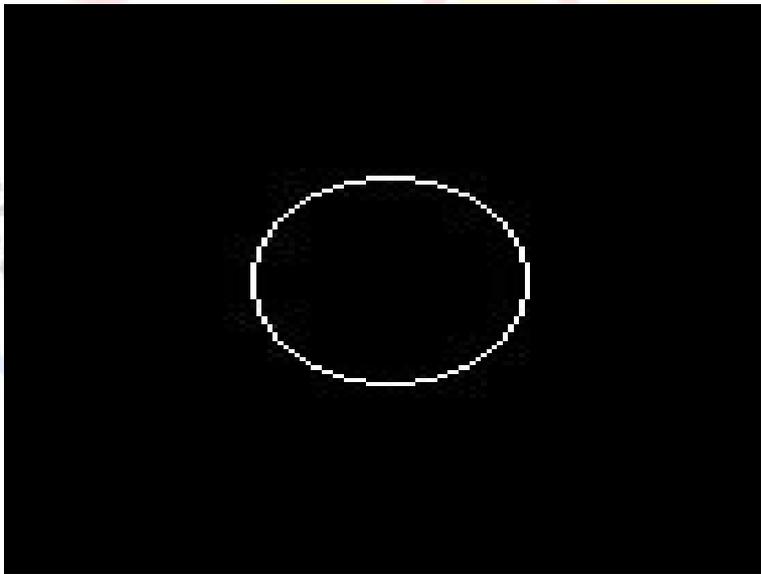
Program 3
Simple line printing

```
#include <graphics.h>
#include <conio.h>
void main()
{
    int gd=DETECT,gm;
    int xmax, ymax;
    initgraph(&gd,&gm,"c:\\tc\\bgi");
    line(150,150,50,50);
    getch();
}
```



Program 4
Circle printing

```
#include <graphics.h>
#include <conio.h>
void main()
{
    int gd=DETECT,gm;
    int xmax, ymax;
    initgraph(&gd,&gm,"c:\\tc\\bgi");
    circle(250,115,25);
    getch();
}
```



Program 5
Hut printing

```
#include <graphics.h>
#include <conio.h>
void main()
{
    int gd=DETECT,gm;
    initgraph(&gd,&gm,"c:\\tc\\bgi");
    rectangle(250,250,400,400);
    rectangle(250,250,190,400);
    line(400,250,400,200);
    line(400,200,216,200);
    line(250,250,215,200);
    line(190,250,215,200);
    for(int i=0;i<40;i++)
    {
        circle(580,60,i);
    }
    getch();
}
```



Program 6
Kite printing

```
#include <graphics.h>
#include <conio.h>
void main()
{
    int gd=DETECT,gm;
    initgraph(&gd,&gm,"c:\\tc\\bgi");
    line(150,150,210,210);
    line(150,150,210,90);
    line(210,90,270,150);
    line(270,150,210,210);
    line(150,150,270,150);
    line(210,90,210,210);
    circle(190,130,5);
    circle(230,130,5);
    circle(190,170,5);
    circle(230,170,5);
    line(210,210,250,250);
    line(210,210,170,250);
    line(170,250,250,250);
    getch();
}
```

