

Assignment No. 7

Title	Animation using C++
Aim/Problem Statement	a) Write a C++ program to control a ball using arrow keys. Apply the concept of polymorphism. OR Write a C++ program to implement bouncing ball using sine wave form. Apply the concept of polymorphism. OR Write C++ program to draw man walking in the rain with an umbrella. Apply the concept of polymorphism. OR Write a C++ program to implement the game of 8 puzzle. Apply the concept of polymorphism. OR Write a C++ program to implement the game Tic Tac Toe. Apply the concept of polymorphism.
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Pre-requisite	1. Basic programming skills of C++ 2. 64-bit Open source Linux 3. Open Source C++ Programming tool like G++/GCC
Learning Objective	To learn scanline polygon fill algorithm.

Theory:

What is animation?

Animation is the process of designing, drawing, making layouts and preparation of photographic sequences which are integrated in the multimedia and gaming products. Animation involves the exploitation and management of still images to generate the illusion of movement.

How to move an element to left, right, up and down using arrow keys?

To detect which arrow key is pressed, you can use ncurses.h header file. Arrow key's code is defined as: KEY_UP, KEY_DOWN, KEY_LEFT, KEY_RIGHT.

```
#include<ncurses.h>
int main()
{
int ch;

/* Curses Initialisations */
initscr();
raw();
 keypad(stdscr, TRUE);
noecho();

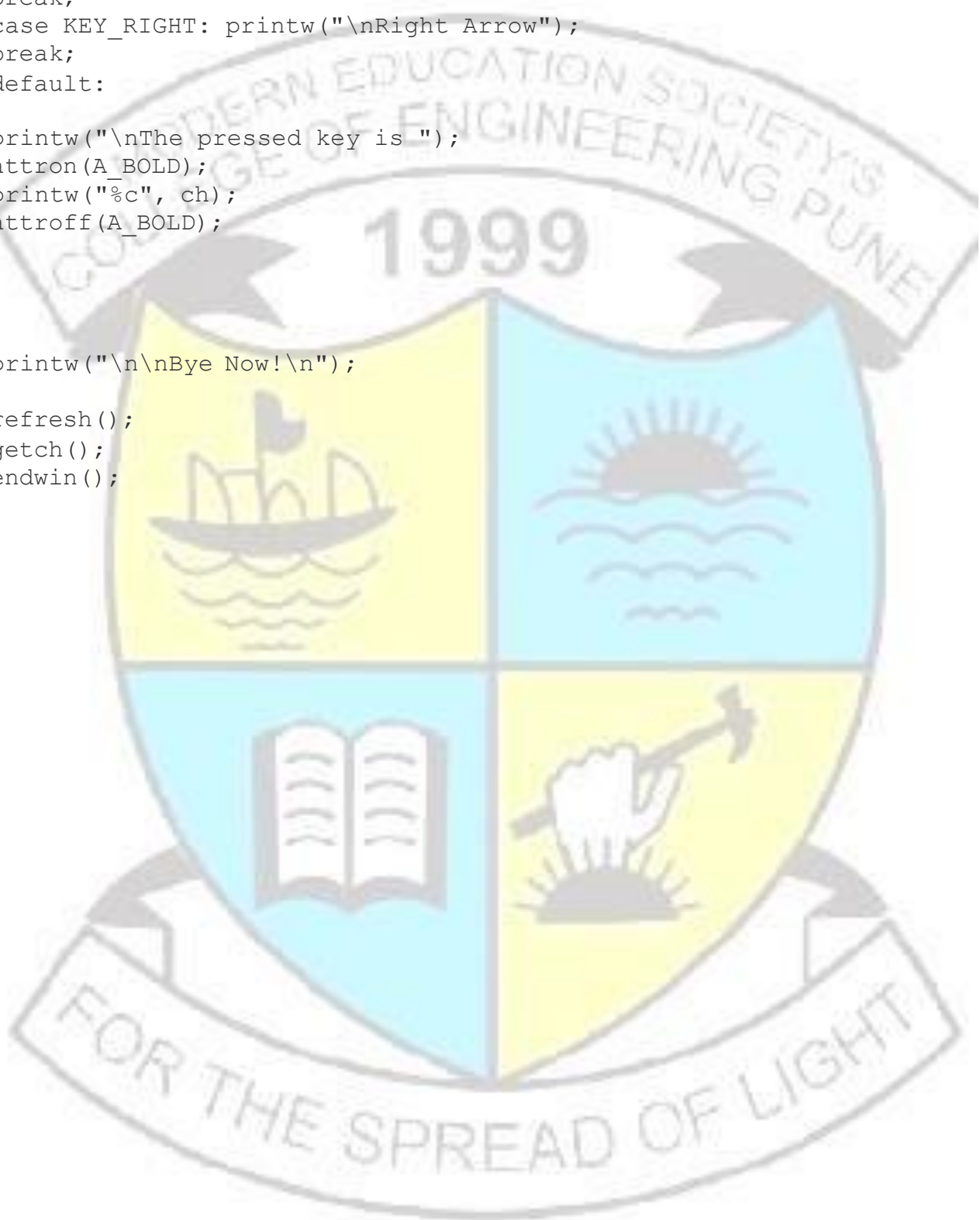
printw("Welcome - Press # to Exit\n");

while((ch = getch()) != '#')
{
switch(ch)
{
```

```
case KEY_UP: printw("\nUp Arrow");
break;
case KEY_DOWN: printw("\nDown Arrow");
break;
case KEY_LEFT: printw("\nLeft Arrow");
break;
case KEY_RIGHT: printw("\nRight Arrow");
break;
default:
{
printw("\nThe pressed key is ");
attron(A_BOLD);
printw("%c", ch);
attroff(A_BOLD);
}
}
}

printw("\n\nBye Now!\n");

refresh();
getch();
endwin();
```



```
return 0;
}
```

How to draw a sine wave using c++?

```
#include <math.h>
#include <graphics.h>
#include <iostream>

int main() {
    int gd = DETECT, gm;
    int angle = 0;
    double x, y;

    initgraph(&gd, &gm, NULL);

    line(0, getmaxy() / 2, getmaxx(), getmaxy() / 2);
    /* generate a sine wave */
    for(x = 0; x < getmaxx(); x+=3) {

        /* calculate y value given x */
        y = 50*sin(angle*3.141/180);
        y = getmaxy()/2 - y;

        /* color a pixel at the given position */
        putpixel(x, y, 15);
        delay(100);

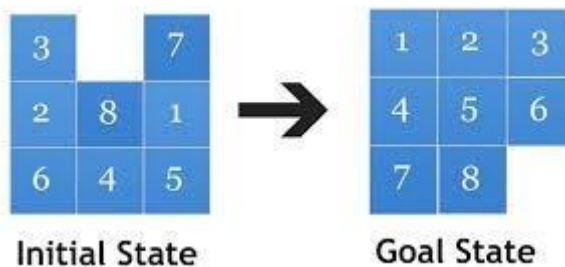
        /* increment angle */
        angle+=5;
    }

    /* deallocate memory allocated for graphics screen */
    closegraph();

    return 0;
}
```

A game of 8 puzzle:

An 8 puzzle is a simple game consisting of a 3 x 3 grid (containing 9 squares). One of the squares is empty. The object is to move to squares around into different positions and having the numbers displayed in the "goal state". The image to the left can be thought of as an unsolved initial state of the "3 x 3" 8 puzzle. Eight digits will in random order. To solve a puzzle, you have to move blocks by performing translation of blocks.



Initial State

Goal State

Implementation of Tic-Tac-Toe game

Rules of the Game

- The game is to be played between two people (in this program between HUMAN and COMPUTER).
- One of the player chooses 'O' and the other 'X' to mark their respective cells.
- The game starts with one of the players and the game ends when one of the players has one whole row/ column/ diagonal filled with his/her respective character ('O' or 'X').
- If no one wins, then the game is said to be draw.

O	X	O
O	X	X
X	O	X

Note: In all above programs, you have to perform translation of an image to show animation effect.

Conclusion:

Questions:

1. What is polymorphism?

