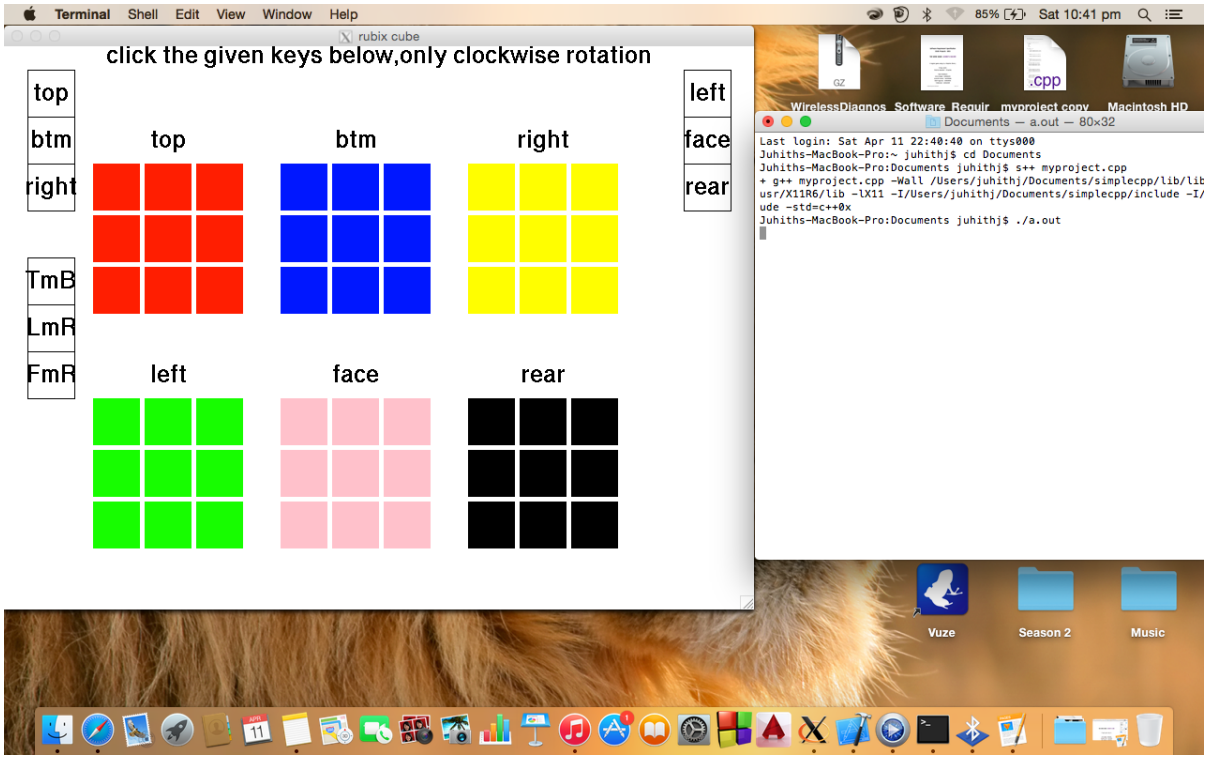
THE MIND GAME :-RUBIK'S CUBE

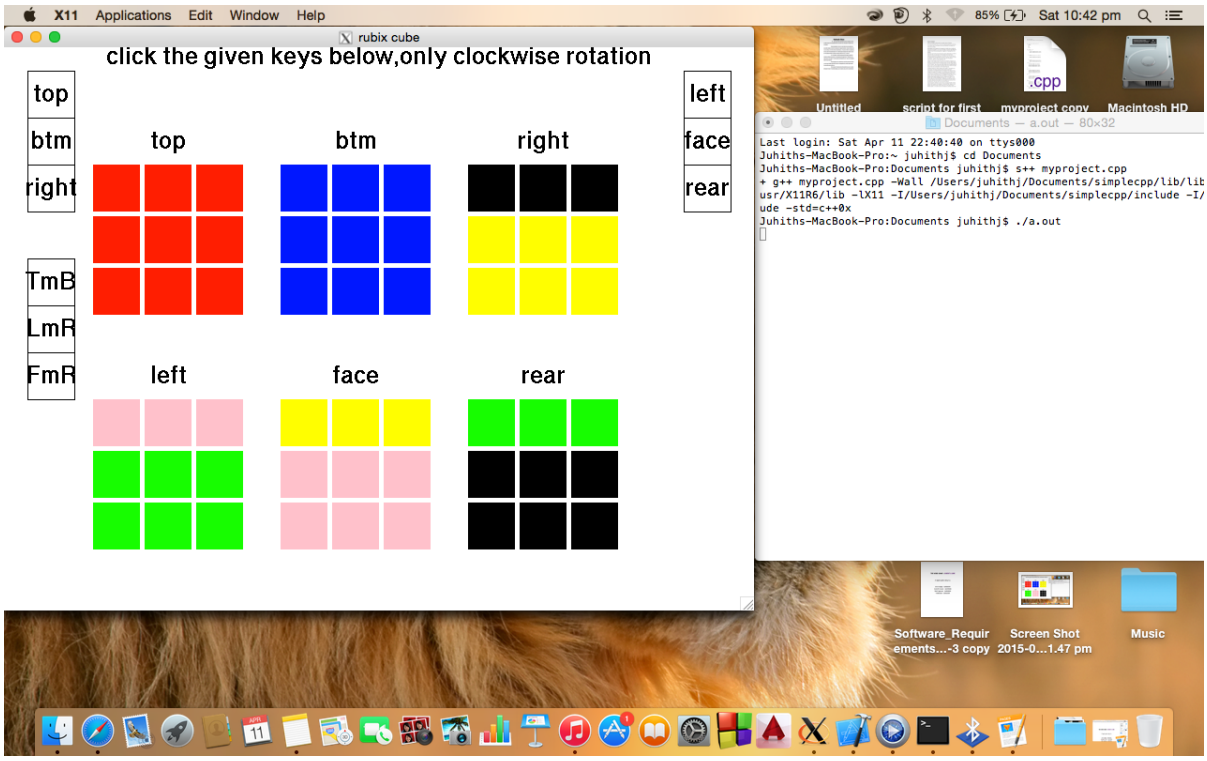
A logical game using C++

M.V.S Deelip 140010035
A.Juhith Kumar 14D170026
Rohit Agarwal 140010026
Y.Abhishek 140040105

PROBLEM STATEMENT :

- In this project our main aim is to make people play with a rubik's cube without actually owning a rubik's cube.
- This project now allows the user to solve the rubik's cube in a computer rather than solving practically.
- Our team developed this project in such a way to give a 2D view of the Rubik's Cube showing all the 6 faces and allows user to control all the rotations which are needed practically to solve the cube.




X11 Applications Edit Window Help
85% Sat 10:42 pm
rubix cube
click the given keys below,only clockwise rotation
top
btm
right
TmB
LmR
FmR
left
face
rear
top
btm
right
left
face
rear
Untitled
script for first
myproject copy
Macintosh HD
Documents — a.out — 80×32
Last login: Sat Apr 11 22:40:40 on ttys000
Juhiths-MacBook-Pro:~ juhithj$ cd Documents
Juhiths-MacBook-Pro:Documents juhithj$ s++ myproject.cpp
+ g++ myproject.cpp -Wall /Users/juhithj/Documents/simplecpp/lib/lib
usr/X11R6/lib -lX11 -I/Users/juhithj/Documents/simplecpp/include -I/
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Juhiths-MacBook-Pro:Documents juhithj$ ./a.out
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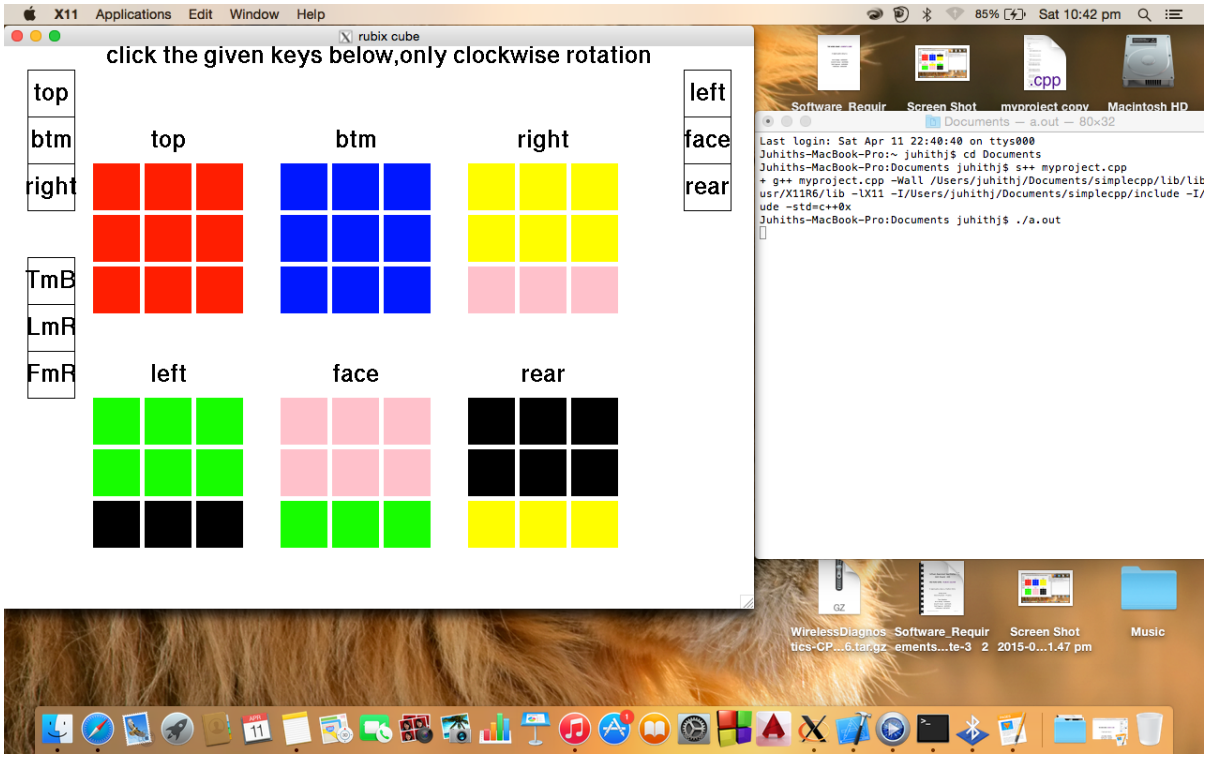
X11 Applications Edit Window Help
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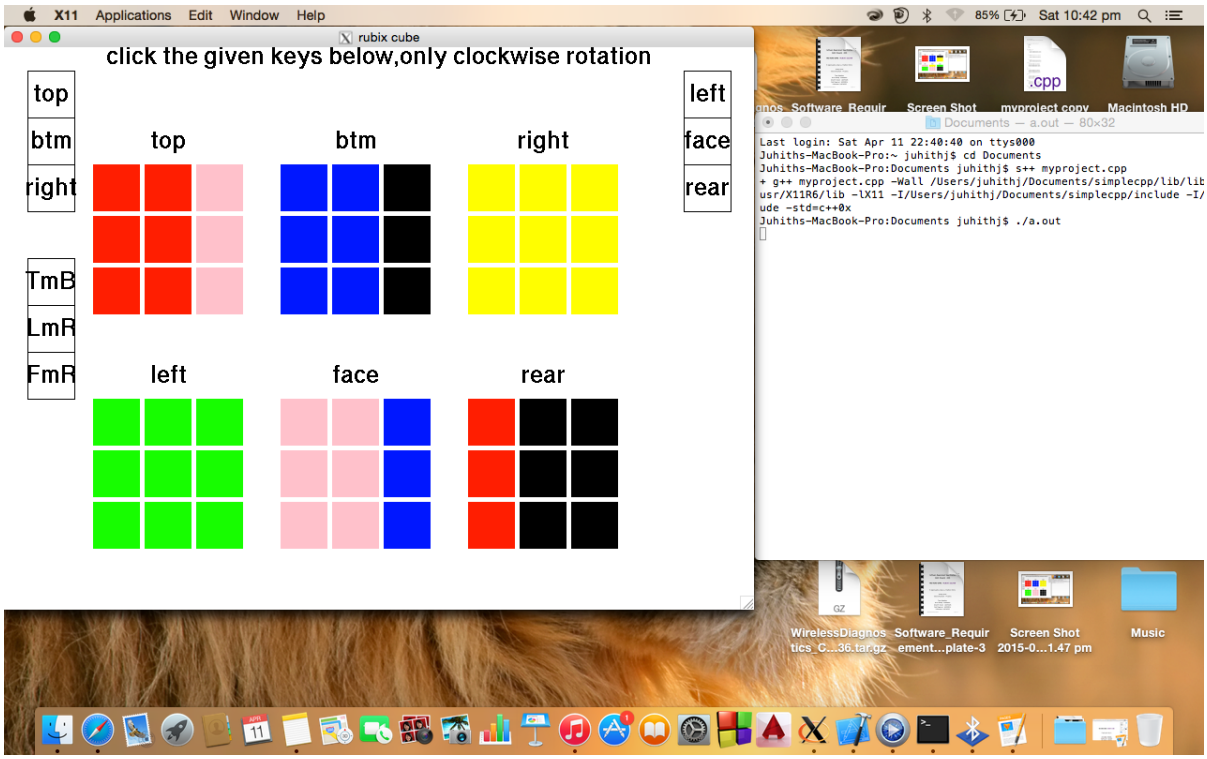
X11 Applications Edit Window Help
85% Sat 10:42 pm
rubix cube
click the given keys below,only clockwise rotation
top
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Juhiths-MacBook-Pro:Documents juhithj$ s++ myproject.cpp
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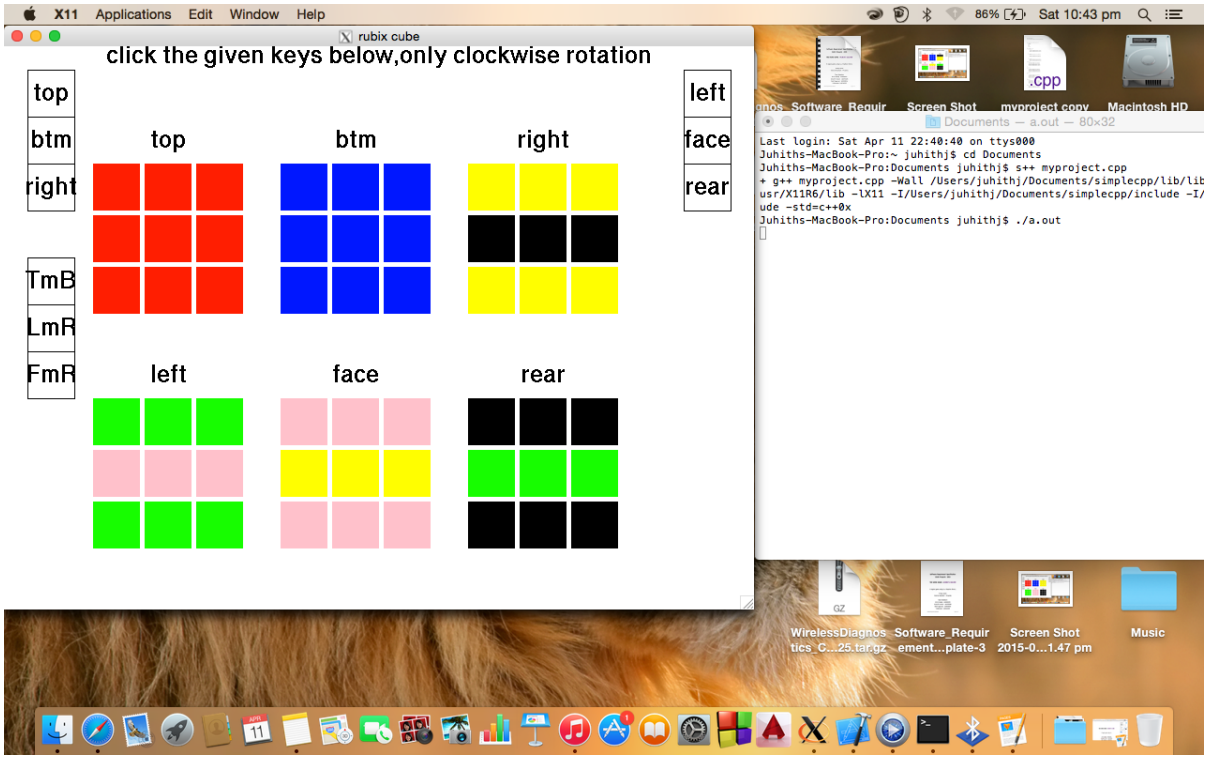
Screen Shot 2015-0...1.47 pm
Music


X11 Applications Edit Window Help
86% Sat 10:43 pm
rubix cube
click the given keys below,only clockwise rotation
top
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TmB
LmR
FmR
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rear
top
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right
left
face
rear
Documents — a.out — 80×32
Last login: Sat Apr 11 22:40:40 on ttys000
Juhiths-MacBook-Pro:~ juhithj$ cd Documents
Juhiths-MacBook-Pro:Documents juhithj$ s++ myproject.cpp
+ g++ myproject.cpp -Wall /Users/juhithj/Documents/simplecpp/lib/lib
usr/X11R6/lib -lX11 -I/Users/juhithj/Documents/simplecpp/include -I/
ude -std=c++0x
Juhiths-MacBook-Pro:Documents juhithj$ ./a.out
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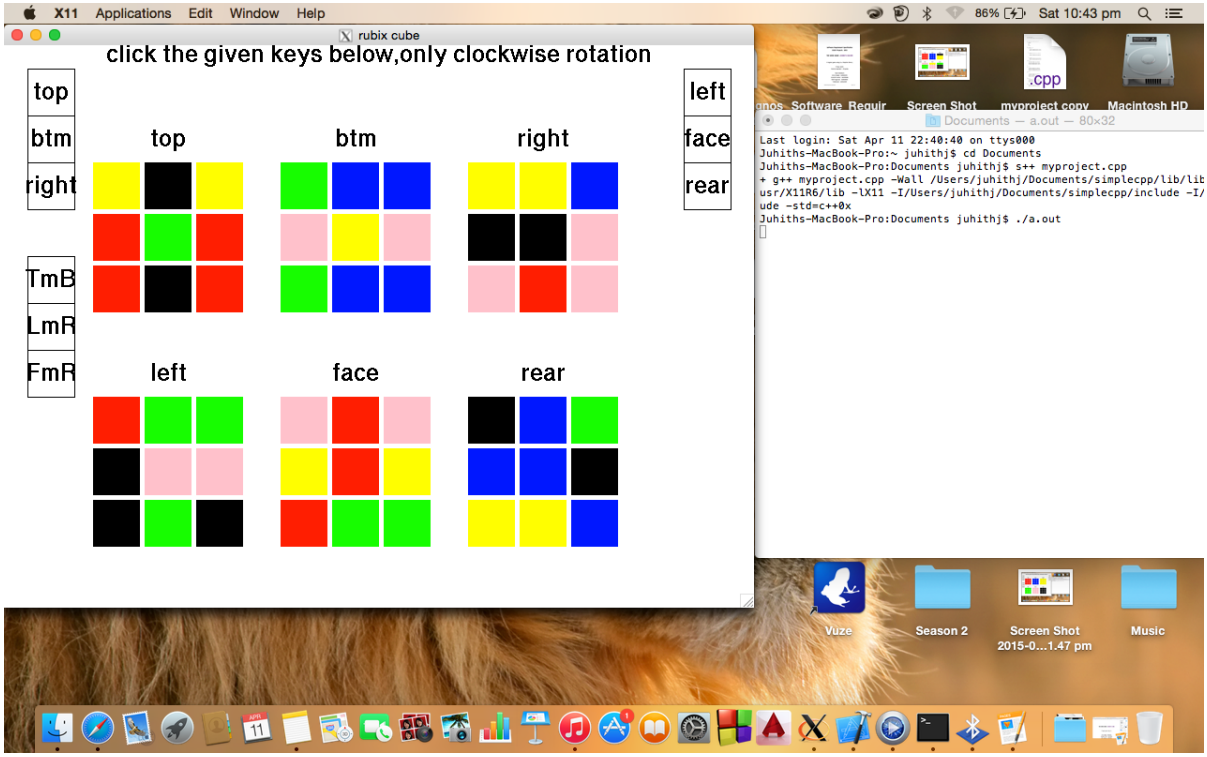
Screen Shot 2015-0...1.47 pm
Music


X11 Applications Edit Window Help
86% Sat 10:43 pm
rubix cube
click the given keys below,only clockwise rotation
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right
TmB
LmR
FmR
left
face
rear
top
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right
left
face
rear
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+ g++ myproject.cpp -Wall /Users/juhithj/Documents/simplecpp/lib/lib
usr/X11R6/lib -lX11 -I/Users/juhithj/Documents/simplecpp/include -I/
ude -std=c++0x
Juhiths-MacBook-Pro:Documents juhithj$ ./a.out
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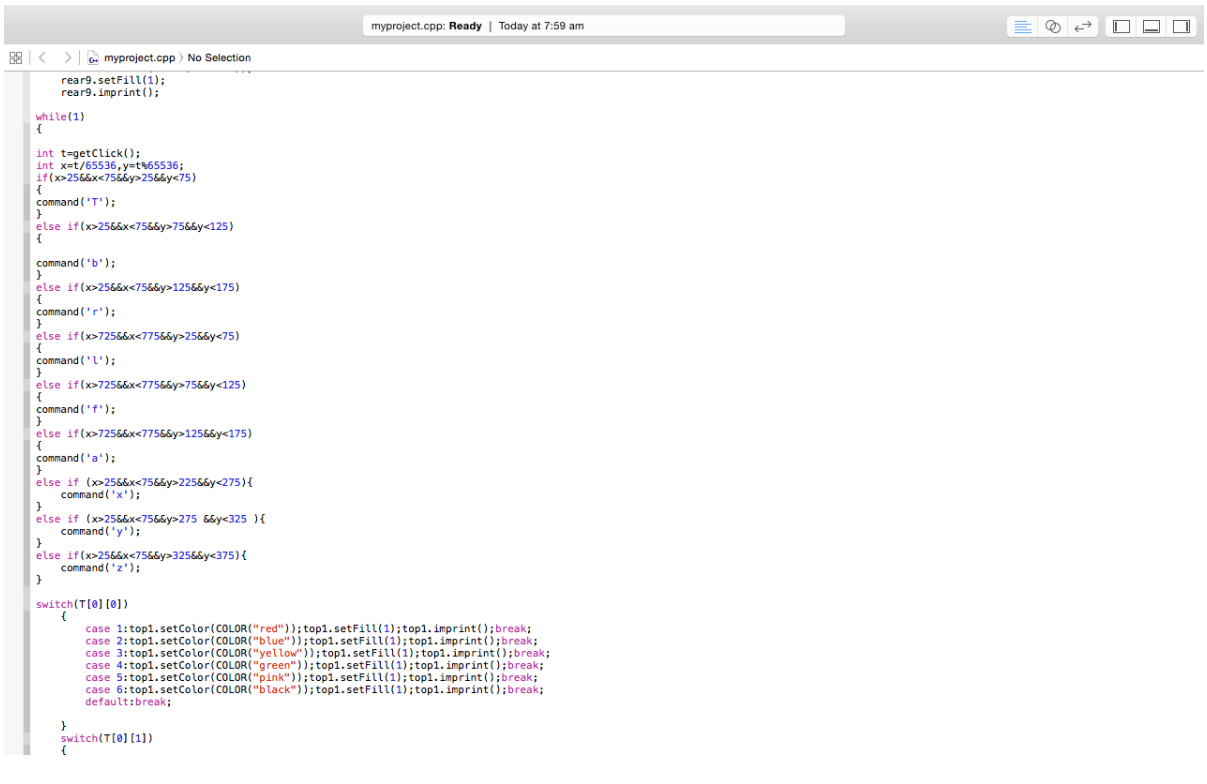
myproject.cpp: Ready | Today at 7:59 am
myproject.cpp 〉 No Selection
rear9.setFill(1);
rear9.imprint();
while(1)
{
int t=getClick();
int x=t/65536,y=t%65536;
if(x>25&&x<75&&y>25&&y<75)
{
command('T');
}
else if(x>25&&x<75&&y>75&&y<125)
{
command('b');
}
else if(x>25&&x<75&&y>125&&y<175)
{
command('r');
}
else if(x>725&&x<775&&y>25&&y<75)
{
command('l');
}
else if(x>725&&x<775&&y>75&&y<125)
{
command('f');
}
else if(x>725&&x<775&&y>125&&y<175)
{
command('a');
}
else if (x>25&&x<75&&y>225&&y<275){
command('x');
}
else if (x>25&&x<75&&y>275 &&y<325){
command('y');
}
else if(x>25&&x<75&&y>325&&y<375){
command('z');
}
switch(T[0][0])
{
case 1:top1.setColor(COLOR("red"));top1.setFill(1);top1.imprint();break;
case 2:top1.setColor(COLOR("blue"));top1.setFill(1);top1.imprint();break;
case 3:top1.setColor(COLOR("yellow"));top1.setFill(1);top1.imprint();break;
case 4:top1.setColor(COLOR("green"));top1.setFill(1);top1.imprint();break;
case 5:top1.setColor(COLOR("pink"));top1.setFill(1);top1.imprint();break;
case 6:top1.setColor(COLOR("black"));top1.setFill(1);top1.imprint();break;
default:break;
}
switch(T[0][1])
{

myproject.cpp: **Ready** | Today at 7:59 am

myproject.cpp › No Selection

```
    }


initCanvas("rubix cube",800,600);
Text cmd(400,10,"click the given keys below,only clockwise rotation");


Text top(50,50,"top");
Text bottom(50,100,"btm");
Text right(50,150,"right");
Text left(750,50,"left");
Text face(750,100,"face");
Text rear(750,150,"rear");
    Text tbm(50,250,"TmB");
    Text lmr(50,300,"LmR");
    Text Frem(50,350,"FmR");


Rectangle top_1(50,50,50,50);
Rectangle bottom_1(50,100,50,50);
Rectangle right_1(50,150,50,50);
Rectangle left_1(750,50,50,50);
Rectangle face_1(750,100,50,50);
Rectangle rear_1(750,150,50,50);
Rectangle tbm_1(50,250,50,50);
    Rectangle lrm_1(50,300,50,50);
    Rectangle frem_1(50,350,50,50);



Text top_2(175,100,"top");
Text bottom_2(375,100,"btm");
Text right_2(575,100,"right");
Text left_2(175,350,"left");
Text face_2(375,350,"face");
Text rear_2(575,350,"rear");


Rectangle top1(120,150,50,50);
top1.setColor(COLOR("red"));
top1.setFill(1);
top1.imprint();


    Rectangle top2(175,150,50,50);
    top2.setColor(COLOR("red"));
    top2.setFill(1);
    top2.imprint();

    Rectangle top3(230,150,50,50);
    top3.setColor(COLOR("red"));
    top3.setFill(1);
    top3.imprint();

    Rectangle top4(120,205,50,50);
```

myproject.cpp: **Ready** | Today at 7:59 am

myproject.cpp › No Selection

```
void swap(int &a,int &b,int &c,int &d)
{
    int temp;
    temp=a;
    a=b;
    b=c;
    c=d;
    d=temp;

}
void command(char ch)
{
    if (ch=='x'){
        swap(F[1][0],R[1][0],RE[1][0],L[1][0]);
        swap(F[1][1],R[1][1],RE[1][1],L[1][1]);
        swap(F[1][2],R[1][2],RE[1][2],L[1][2]);


    }
    if (ch=='y'){
        swap(T[1][0],L[2][1],B[1][2],R[0][1]);

        swap(T[1][1],L[1][1],B[1][1],R[1][1]);
        swap(T[1][2],L[0][1],B[1][0],R[2][1]);


    }
    if (ch=='z') {
        swap(F[0][1],T[0][1],RE[2][1],B[0][1]);
        swap(F[1][1],T[1][1],RE[1][1],B[1][1]);
        swap(F[2][1],T[2][1],RE[0][1],B[2][1]);
    }
if(ch=='T')
 {
     swap(T[0][0],T[2][0],T[2][2],T[0][2]);
     swap(T[1][0],T[2][1],T[1][2],T[0][1]);
     swap(F[0][0],R[0][0],RE[0][0],L[0][0]);
     swap(F[0][1],R[0][1],RE[0][1],L[0][1]);
     swap(F[0][2],R[0][2],RE[0][2],L[0][2]);

 };

if(ch=='b')
 {
     swap(B[0][0],B[2][0],B[2][2],B[0][2]);
     swap(B[1][0],B[2][1],B[1][2],B[0][1]);
     swap(F[2][0],L[2][0],RE[2][0],R[2][0]);
     swap(F[2][1],L[2][1],RE[2][1],R[2][1]);
     swap(F[2][2],L[2][2],RE[2][2],R[2][2]);

 }
if(ch=='r')
 {

     swap(R[0][0],R[2][0],R[2][2],R[0][2]);
```

CHALLENGES :

- In this code we got a major difficulty in how to change the colours in every face when any face is rotated.
- Then we got the idea of representing each colour by a number .This converts the rubik's cube with 6 colours to a new Rubik's cube with 6 numbers .
- We later also came across a problem in representing the middle two faces which are necessary to rotate in order to solve .
- Later we came with an idea of giving an option to rotate the middle parts of left and right , front and rear , top and bottom faces.
- We gave individual name to each of the nine small squares in each face so as to give different colours individually by using switch cases.

FUTURE WORK:

- This code can be extended to make a 4x4 , 5x5 or any NxN rubik's cube by increasing the array size and individually giving names to each small square in each face .
- We can also extend this project into a 3d version by using other higher graphics library.