Individual Projects(20 points)

- Solution 7 checkerboard.cpp blockplot.cpp :Compiling separate files.
- Animated gif : GD library
- Compiling with libraries
- Science Simulation: Octave, GSL libraries

Compiling Separate Files

- checkerboard.cpp
- blockplot.cpp
- gimageD.h gimageF.cpp
- gplotd.h gplotf.cpp
- It is frequently convenient to divide the program between several files
  - g++ -o myprog checkerboard.cpp blockplot.cpp gimageF.cpp gplotf.cpp
  - g++ -o myprog –g checkerboard.cpp blockplot.cpp gimageF.cpp gplotf.cpp

Animated gifs

- Transparency in computers
- GD library
- squares.cpp
- g++ -o squares squares.cpp -lgd
- gd drawing functions
- gd query functions
- gd color functions
- devil.cpp

Science Simulation

Simulate a wave on a membrane; fourier series solution

Make a 1000 movie frames

```
for (t=0; t<=1000; t++){
  for (nx=1;nx <=10; nx++)
      for (ny=1;ny <=10; ny++){
         coeff=(1-pow(-1,nx)*(1-pow(-1,ny))/(pow(nx,3)*pow(ny,3));
          for (i=0;i<10;i++)
               for(j=0;j<10;j++)
               z[i][j] =z[i][j]+coeff*sin(nx*pi*x[i][j] )*sin(ny*pi*y[i][j] )
      *cos(sqrt(nx*nx+ny*ny)*pi*t/100);
        }
     Create a surface plot of Z using octave functions
      Save z to a file using octave or gd functions
}
```

combine frames to make a movie, use ffmpeg;

Assignment
(Draft Due December 3; Final Design Due Dec 8)

Produce a animated gif or a science simulation movie.

1. You should design an interesting animated gif or science simulation movie that at a minimum requires you to manipulate the individual pixels of each frame.
2. Produce a top down design of a program to produce your project. The top down design should show several stages:
   a. Show the basic program elements
   b. Refine each of the basic program elements into a collection of simpler elements.
   c. Repeat b. until you reach the coding level