CS 230, Quiz 5

Solutions

You will have 8 minutes to complete this quiz. No books, notes, or other aids are permitted.

Problem 1

Write the body of the C++ routine below. The routine should draw a *filled* circle centered at `(cx,cy)` with radius `r`. The image has width `w` and height `h`. You may fill a pixel by calling `void draw(int x, int y);`. Don't worry about minor things (C++ syntax errors, off by one pixel, whether to fill pixels exactly on the circle, include files, etc.).

Extra Credit (+10%): Handle the case where the circle is partially outside the image.
Extra Credit (+10%): Do not use any floating point.
Extra Credit (+10%): Run in time $O(p)$, where p is the number of pixels actually filled.

```cpp
void rasterize_circle(int cx, int cy, int r, int w, int h)
{
  int x0=std::max(cx-r,0);
  int x1=std::min(cx+r,w-1);
  int y0=std::max(cy-r,0);
  int y1=std::min(cy+r,h-1);
  for(int x=x0; x<=x1; x++)
    for(int y=y0; y<=y1; y++)
      if((x-cx)*(x-cx)+(y-cy)*(y-cy)<=r*r)
        draw(x,y);
}
```