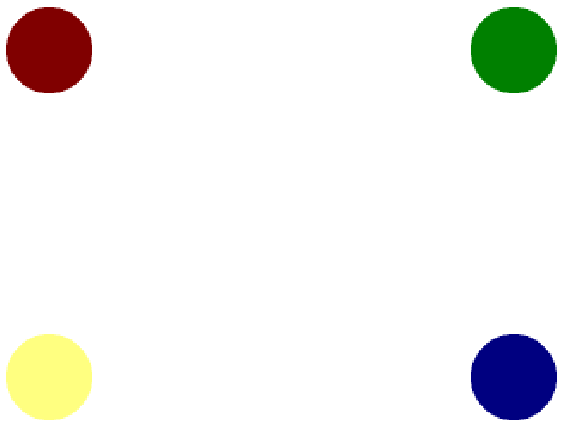
Clip Rendering and Sprite Sheets



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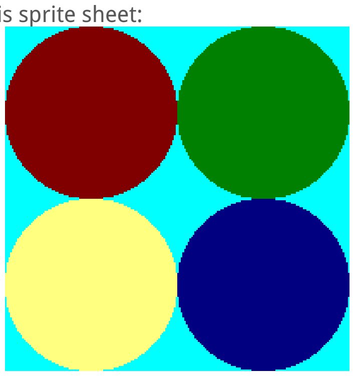
Sometimes you only want to render part of a texture. A lot of times games like to keep multiple images on the same sprite sheet as opposed to having a bunch of textures. Using clip rendering, we can define a portion of the texture to render as opposed to rendering the whole thing.

```
//Texture wrapper class
class LTexture
{
    public:
        //Initializes variables
        LTexture();

        //Deallocates memory
        ~LTexture();

        //Loads image at specified path
        bool loadFromFile( std::string path );

        //Deallocates texture
        void free();

        //Renders texture at given point
        void render( int x, int y, SDL_Rect* clip = NULL );

        //Gets image dimensions
        int getWidth();
        int getHeight();

    private:
        //The actual hardware texture
        SDL_Texture* mTexture;

        //Image dimensions
        int mWidth;
        int mHeight;
};
```

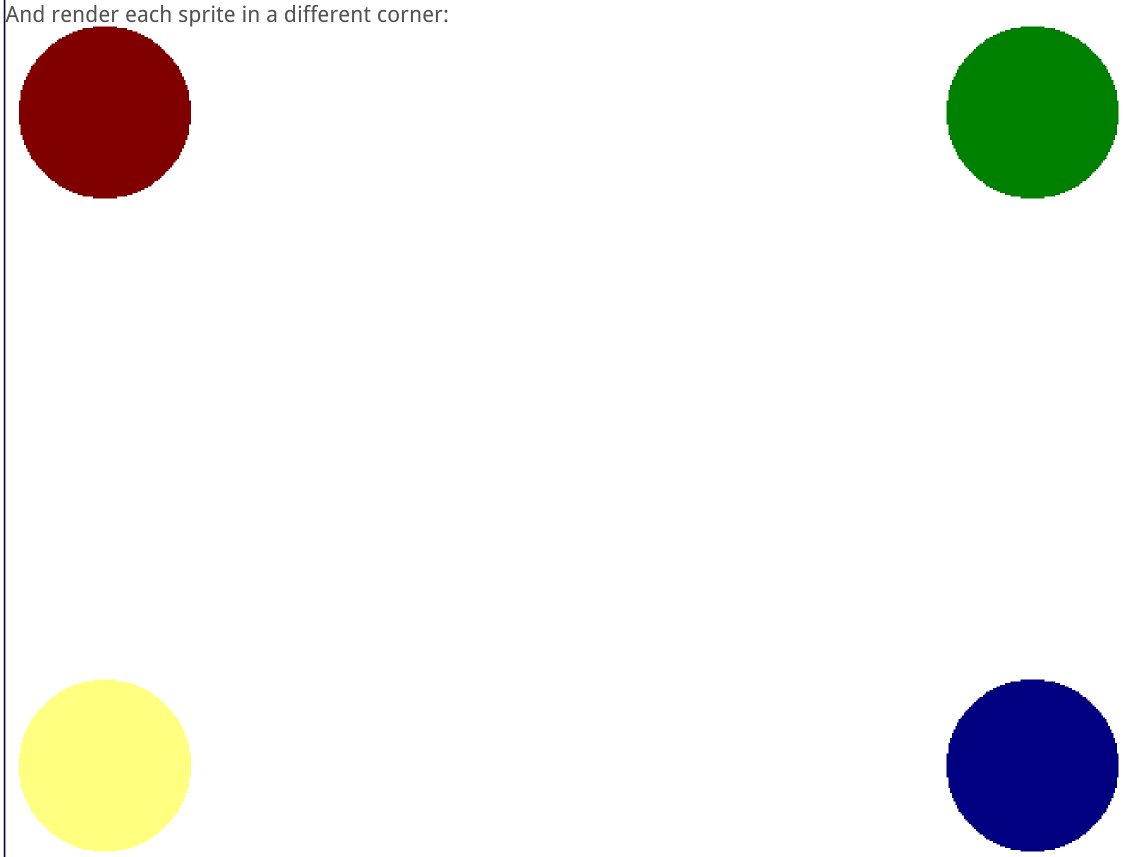
Here we're making a small tweak to the rendering function in the texture class. The render function now accepts a rectangle defining which portion of the texture we want to render. We give it a default argument of NULL in case we want to render the whole texture.

```
//Scene sprites
SDL_Rect gSpriteClips[ 4 ];
LTexture gSpriteSheetTexture;
```

For this tutorial, we're going to take this sprite sheet:



And render each sprite in a different corner:



So we're going to need a texture image and 4 rectangles to define the sprites, which are the variables you see declared here.

```
void LTexture::render( int x, int y, SDL_Rect* clip )
{
    //Set rendering space and render to screen
    SDL_Rect renderQuad = { x, y, mWidth, mHeight };

    //Set clip rendering dimensions
    if( clip != NULL )
    {
        renderQuad.w = clip->w;
        renderQuad.h = clip->h;
    }
    //Render to screen
    SDL_RenderCopy( gRenderer, mTexture, clip, &renderQuad );
}
```

Here's the new rendering function for the texture class that supports clip rendering. It's mostly the same as the previous texture rendering function but with two changes.

First, since when you're clipping and you're using the dimensions of the clip rectangle instead of the texture, we're going to set the width/height of the destination rectangle (here called renderQuad) to the size of the clip rectangle.

Secondly, we're going to pass in the clip rectangle to SDL_RenderCopy as the source rectangle. The source rectangle defines what part of the texture you want to render. When the source rectangle is NULL, the whole texture is rendered.

```
bool loadMedia()
{
    //Loading success flag
    bool success = true;

    //Load sprite sheet texture
    if( !gSpriteSheetTexture.loadFromFile( "11_clip_rendering_and_sprite_sheets/dots.png" ) )
    {
        printf( "Failed to load sprite sheet texture!\n" );
        success = false;
    }
    else
    {
        //Set top left sprite
        gSpriteClips[ 0 ].x =   0;
        gSpriteClips[ 0 ].y =   0;
        gSpriteClips[ 0 ].w = 100;
        gSpriteClips[ 0 ].h = 100;

        //Set top right sprite
        gSpriteClips[ 1 ].x = 100;
        gSpriteClips[ 1 ].y =   0;
        gSpriteClips[ 1 ].w = 100;
        gSpriteClips[ 1 ].h = 100;

        //Set bottom left sprite
        gSpriteClips[ 2 ].x =   0;
        gSpriteClips[ 2 ].y = 100;
        gSpriteClips[ 2 ].w = 100;
        gSpriteClips[ 2 ].h = 100;

        //Set bottom right sprite
        gSpriteClips[ 3 ].x = 100;
        gSpriteClips[ 3 ].y = 100;
        gSpriteClips[ 3 ].w = 100;
        gSpriteClips[ 3 ].h = 100;
    }

    return success;
}
```

The media loading function loads the texture and then defines the clip rectangles for the circle sprites if the texture loaded successfully.

```
            //While application is running
            while( !quit )
            {
                //Handle events on queue
                while( SDL_PollEvent( &e ) != 0 )
                {
                    //User requests quit
                    if( e.type == SDL_QUIT )
                    {
```

```
                quit = true;
            }
        }

        //Clear screen
        SDL_SetRenderDrawColor( gRenderer, 0xFF, 0xFF, 0xFF, 0xFF );
        SDL_RenderClear( gRenderer );

        //Render top left sprite
        gSpriteSheetTexture.render( 0, 0, &gSpriteClips[ 0 ] );

        //Render top right sprite
        gSpriteSheetTexture.render( SCREEN_WIDTH - gSpriteClips[ 1 ].w, 0, &gSpriteClips[ 1 ] );

        //Render bottom left sprite
        gSpriteSheetTexture.render( 0, SCREEN_HEIGHT - gSpriteClips[ 2 ].h, &gSpriteClips[ 2 ] );

        //Render bottom right sprite
        gSpriteSheetTexture.render( SCREEN_WIDTH - gSpriteClips[ 3 ].w, SCREEN_HEIGHT - gSpriteClips[ 3 ].h, &gSpriteClips[ 3

        //Update screen
        SDL_RenderPresent( gRenderer );
    }
```

Finally here in the main loop we render the same texture 4 times, but we're rendering a different portion of the sprite sheet in different places each call.

Download the media and source code for this tutorial here.

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