Project Report - CS210

Title – Planet Defender VGA Game in C

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This project was to familiarize with the fpga development board and related tools, technologies and cpu architecture . I have made Planet Defender game where a Space ship has to shoot down incoming asteroids to save earth.

DESCRIPTION / METHODOLOGY–

Game objects= Sprites

First for the game sprites(airship ,background, asteroid, bullets, explosion) etc I have taken reference images from web and scaled down to vga resoultions. After I extracted rgb values from that image for every pixel . Then I used a python program to convert those rgb values into rgb16 and stored in a 2d array of respective sprites. So for displaying sprites, the write pixel function is called over that 2d array . Some screenshots in appendix 1 and 2.

Game Logic-

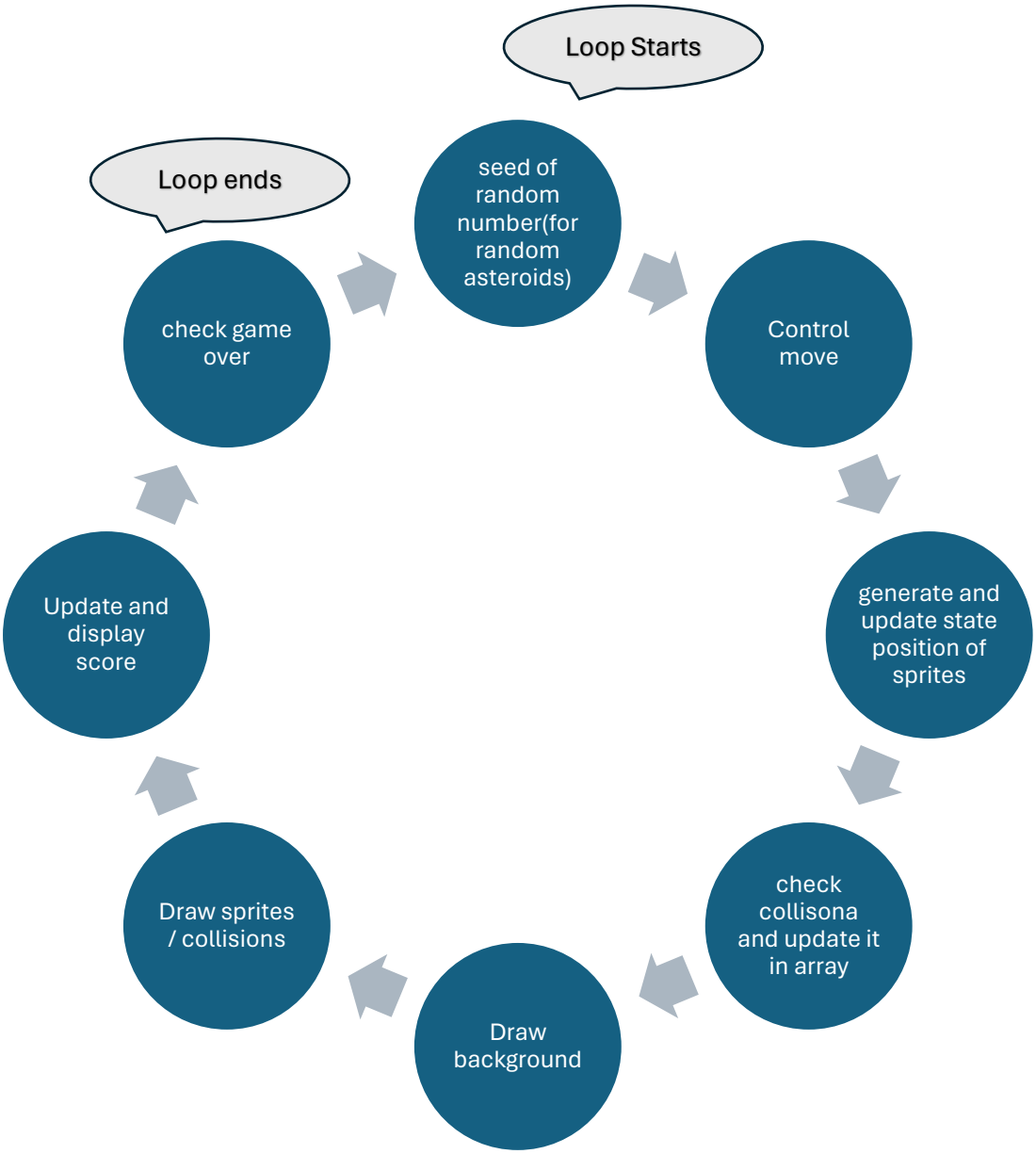
I have made a graphics section in code where all the array holding rgb16 values of sprites are there along with their displaying functions

I have made various variable, arrays and datastructures for sprites positions, asteroids details(health,speed,positions),bullets etc

The game is started with initial intro screen followed by placements of objects, difficulty levels,score etc.

1 frame is considered every 1 iteration of while loop

In 1 frame-



After game over there is restart option.

In the end of game , freeing any dynamically allocated memory

Results-Some screenshots of game in appendix 3,4.

Errors faced-

As I have used ps2 keyboard for input . Configuring and detecting certain input keys was a challenge.

After many errors I faced in collision detection function I came up with a working function with refined logic.

Optimising the frame time due to drawing of sprites was challenging (removing unrequired pixel writes per frame).

Conclusions / Learning –

I learnt more about de1soc board , its layout , devices, memory configuration,addresses etc. Familiarized with tools/hardwares and languages like Vga , ps2 keyboards, C, pointers.

Got to know more about Rgb schemes.

Got to know about more of processors like ARM,nios || .

References –

Some C syntaxes from web, sprite images (spaceship, earth, asteroids etc) , photoshop(scaling down resolution to vga proportionate) , online cpulator (simulating the game code before actual run)