GRAPHICS PROJECT: A FOOTBALL FIELD USING OPENGL

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Introduction

The project revolves around a football stadium and is built using OpenGL 3.3.

Fig 1.1: Overview of Football stadium

Libraries Used

1) **Glad:** Glad is a straightforward and simple loader generator that manages OpenGL function pointers, enabling easy and efficient management of OpenGL extensions
2) **GLFW:** GLFW is a multi-platform library for creating windows, contexts, and handling input, useful in OpenGL applications
3) **Glm:** GLM is a mathematics library designed for graphics software; it provides vector and matrix operations compatible with OpenGL Shading Language (GLSL)
4) **Stb_image:** stb_image is a simple C library for loading image files; it's lightweight and easy to integrate into various projects for image loading

Textures used

Textures used in the following project is given below:

Fig 1.2: Game over

Fig 1.3: Field

Fig 1.4: Chair

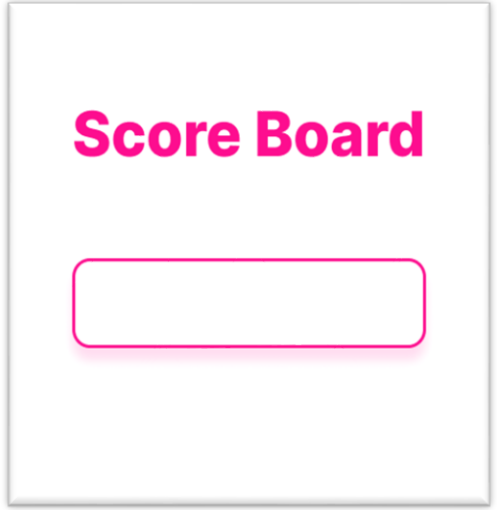

Fig 1.5: Scoreboard

Type of light used

1) **Point light**
2) **Directional light**
3) **Spot light**

Different views of stadium

East Gallery

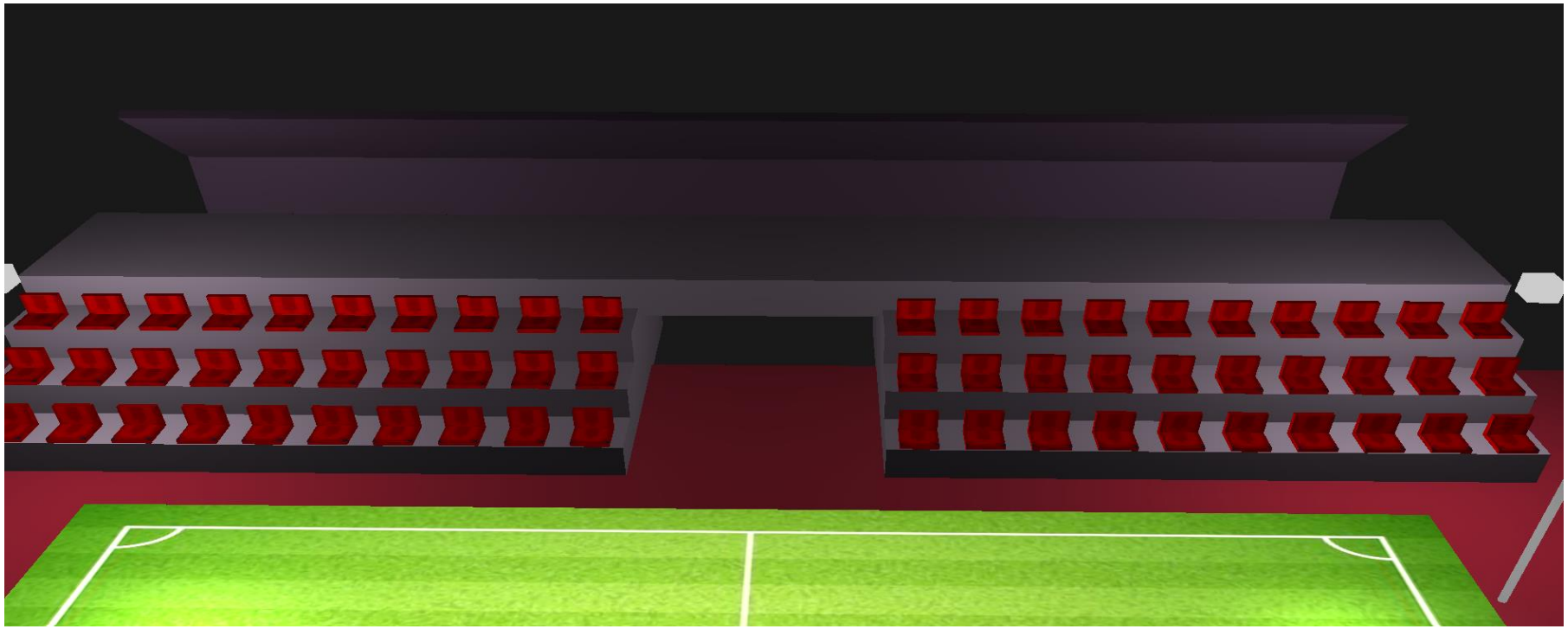

Fig 1.6: East Gallery

Different views of stadium

West Gallery

Fig 1.7: East Gallery

Different views of stadium

North and South Gallery

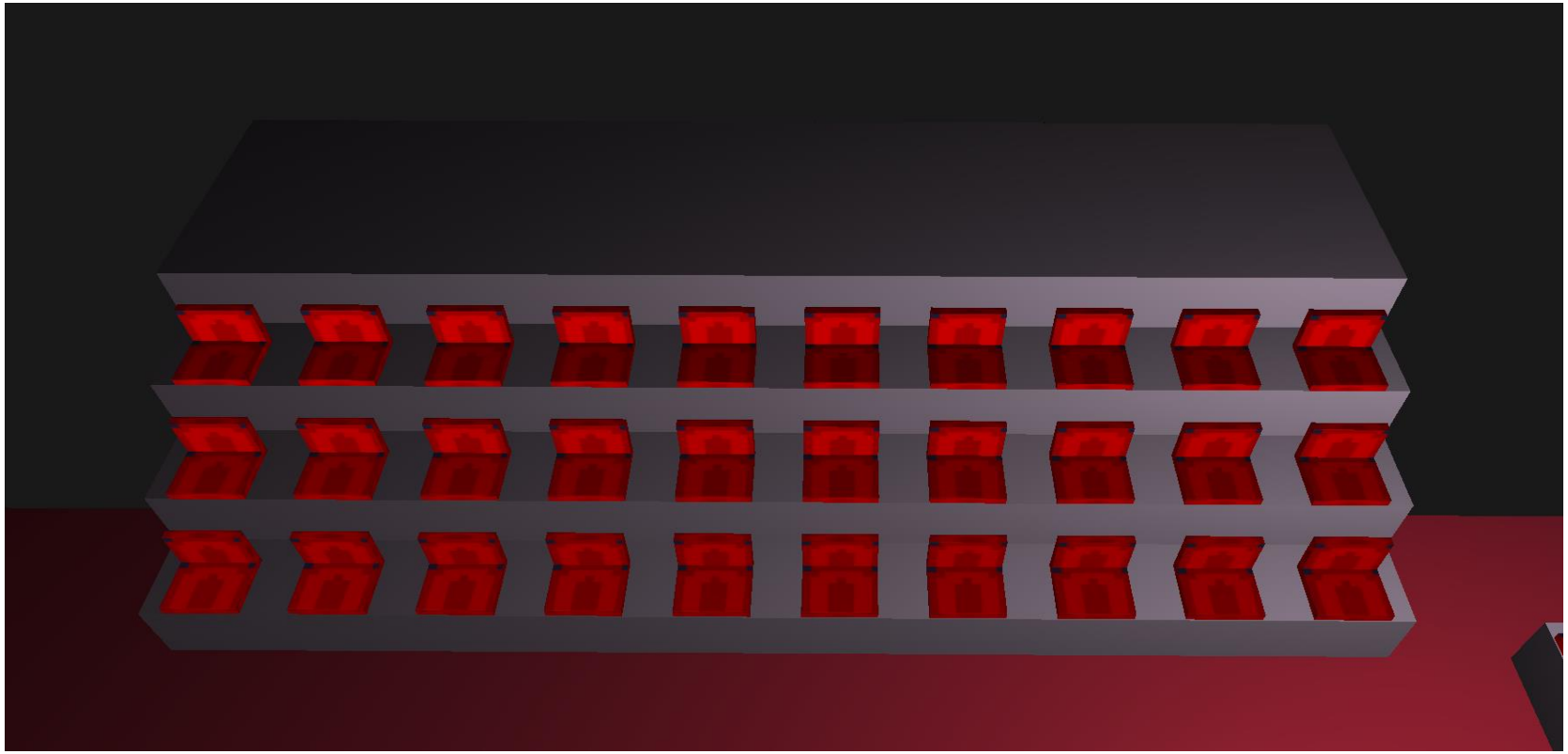

Fig 1.8: North and South Gallery

Different views of stadium

Game over state

Fig 1.9: Game over state

Different views of stadium

The ball will go to the direction where the arrow is pointing. We can change the direction of the arrow.

Fig 1.10: playing game state

Different views of stadium

In the higher difficulty, the bar starts to move right and left. The speed of this movement varies with difficulty level.

Fig 1.11: Playing game with higher difficulty

Different views of stadium

Field & Ball

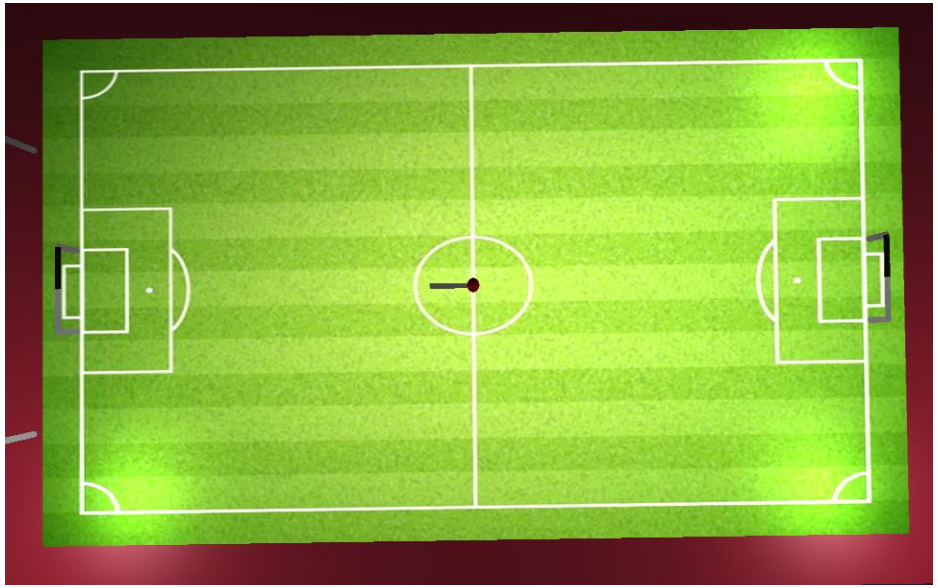

Fig 1.12: Field view

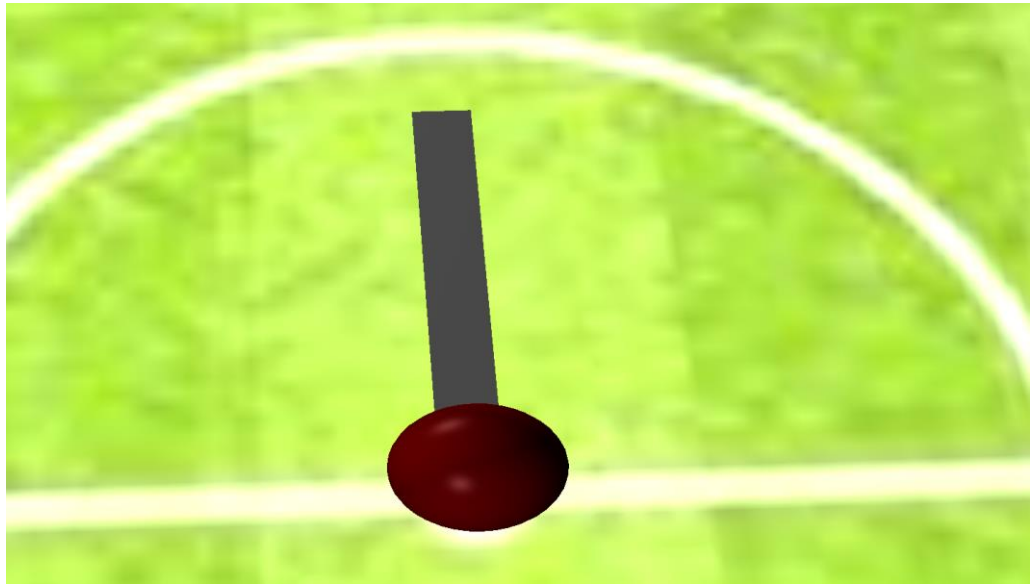

Fig 1.13: Ball view with arrow

Control Keys

Key	Function
ESCAPE	Close window
W	Forward
S	Backward
D	Right
M	YAW_R
N	YAW_L
J	Left move of Ball angle
Right	Right move of Ball angle
G	Ball shooting
I	Difficulty level 1
O	Difficulty level 2
P	Difficulty level 3
2	Toggling point light

Control Keys

Key	Function
3	Toggling spot light
1	Toggling directional light
4	Ambient property
5	Diffuse property
6	Specular property

Conclusion

While the project presented some challenges during implementation, the learning curve was impressive. I believe the knowledge acquired while working on this project will be instrumental in tackling more complex graphical projects in the future.

References

1) https://learnopengl.com/Getting-started/OpenGL
2) Ed Angel, (2013), Introduction to Modern OpenGL Programming [PowerPoint slides], University of New Mexico. https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=0CAIQw7AJahcKEwiQmpaO9feAAxUAAAAAHQAAAAAQAg&url=https%3A%2F%2Fwww.cs.unm.edu%2F~angel%2FSIGGRAPH13%2FAn%2520Introduction%2520to%2520OpenGL%2520Programming.pptx&psig=AOvVaw2kK85Jyj7mtAWvopHq2SLZ&ust=1693056429705470&opi=

Thank You