

Combat Arena

Christoff Kügler 11807868
Christian Pratellesi 12118532

Gameplay

The aim of the game is to collect all chests in the fastest time possible. The chests can be found on top of the towers distributed around the arena. To gather the chests the player has to shoot them so they fall down on the floor where they can be collected. The towers however, can also shoot at the player and will try to stop them. Additionally, there are enemies that follow the player around. On top of that, some moving objects are scattered on the floor, which can also hurt the player. To escape from all that, the player can flee on top of some fixed boxes on the ground and have a rest (although the towers will not stop to shoot them). When all chests are collected or the player has no health left, the game ends and a final score is computed, using the enemies killed and the time on the clock.

The collision detection and the advanced physics were implemented using the PhysX library. The collision detection can be seen almost everywhere. Most prominent in the gameplay are the collisions with bullets or between the player and the enemies. The advanced physics are demonstrated when the player shoots a chest and it tumbles down to the ground, solely controlled by the physics engine. To give the player some feedback and orientation, a heads up display was implemented using the freetype library.

Controls

W A S D	movement
space	jump
left mouse button	shoot
mouse	look around
ESC	close window
E	switch flashlight on/off
H	toggle HUD
F	toggle fullscreen
B	increase brightness

V	decrease brightness
F7	decrease window size
F8	increase window size
F9	toggle normal mapping

Effects

Shadow Map with PCF	Shadows can be seen in the entire scene. It is best visible on the floor next to various objects like the towers.
CPU Particle System	Particles are emitted from the chests the player has to collect to win the game. They can be found at the top of the towers.
GPC Vertex Skinning	The enemies are animated using vertex skinning. The walking animation can be seen then the enemies march towards the player.
Video Texture	A video wall can be seen on one side, slightly above the arena. It shows a video at 25 frames per second, about 3.5 seconds long.
Simple Normal Mapping	The normal mapping can be seen at the surface of the towers. It is best visible when standing close to the tower with the flashlight turned on.

References

Libraries

- [PhysX](#) for physics simulations
- [Assimp](#) for model loading
- [Freetype](#) to render text

Resources

- [GitHub: Sample Submarine](#)
- [GitHub: Contact Report Snippet](#)
- [PhysX Doc: Callbacks](#)
- [PhysX Doc: Character Controller](#)
- [CG Slides on PhysX](#)
- [E-Book on PhysX](#)
- [YouTube: Tutorial on Skeletal Animation](#)
- [GitHub: Repo on Skeletal Animation Tutorial](#)
- [learnopengl.com](#)