Game Programming Laboratory --- 251-257-00L

SpeedThugs

Formal Game Report

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Game Description

SpeedThugs is a high-speed racing game with hovercraft-like vehicles. As an exemplary game you might think of the WipEout series, the F-Zero series or the Extreme-G series, but only in the wide sense.

Detail

Game Modes

The goal of the game is to finish the track as fast as possible or crossing the finish line in first place, depending on the game mode. If you play in the time attack mode, you have to finish the track as fast as possible without exceeding a certain time limit. Single player race lets you drive against computer guided enemy vehicles and in the two player mode you can race against your friends. The possibility to tune vehicles in terms of their properties would be even more fun. Good results in the time attack mode let you unlock better vehicles, giving you the chance to master harder time attack challenges and again get a better vehicle...

The Track

We intend to make one track with curves, jumps and possibly movable obstacle. The track should be a challenge, including shortcuts and alternative ways, where shortcuts are harder to make than the normal route or may only be reached by using a nitro boost. Power ups are placed regularly and sometimes there will be power ups which are hard to reach but worth the effort. Gravity fields along the track force you to adapt your driving style. Not making a jump to the other side results in a reset of the vehicle on the track, which will cost time. Imagine the track looking like a roller coaster. Background details around the track could be added.

The vehicles

We intend to have two different hovercraft vehicles, each with different properties (e.g. Acceleration, handling etc.). They should behave physically correct in the sense of behavior and have typical features like nitro boosts, rocket launchers, energy guns, mines etc., each one allowing you to either drive faster than your opponents or to slow your opponents down. Of course there is only a limited amount of each special feature, but you may collect power ups during the race to refill ammo and nitro. The vehicles have a limited energy shield. If you take damage, the shield is reduced. An empty shield will result in a reset of the vehicle and therefore cost time. Power ups to refill shield may be collected.

Weapons, Nitro and Energy

Initially the vehicle has no nitro and no weapons, but it has a full energy shield. Everything can be refilled by collecting power ups. Using a nitro boost results in higher acceleration and higher maximum speed. The boost only lasts a limited time. Energy gun shots look like pulsing, light emitting balls. They do medium damage and are also available as a multi shot version, where three shots are fired at once into three different directions. Rockets have a homing ability and they avoid collisions with the track boundaries and obstacles, tracking down the next enemy

vehicle. Mines are placed behind the vehicle and they explode when a vehicle drives over them, damaging that vehicle.

Collisions

Collision detection is performed between the different vehicles, obstacles and the track itself. Collisions may result in damage to the vehicle or in a slow down. If you get too close to the boundary of the track, you will be slowed down. If you hit an obstacle, the boundary of the track or another vehicle, you will take damage and be slowed down.

Rigid Body Engine

A good Rigid Body engine should allow us to place movable obstacles and jumps along the track. Hitting objects is fun and therefore should not always be penalized with damage or a slow down. Varying the gravity at different places along the track should look cool and make the track more challenging since players have to adapt to alternating environments. Imagine for example regions of low gravity and regions where the direction of gravity changes and therefore you will be draged towards the track boundary or you even drive “upside down”.

Graphics

The game comes in a cel shading look, giving it a futuristic arcade look. Additional shaders may support effects like motion blur at high speeds and other effects for explosions and weapons. Especially motion blur helps to make the player “feel” the speed. The camera will be set behind the vehicle.

Sound

Sound effects are supposed to add to the experience as they demonstrate the power of a rocket or a nitro boost, for example. Varying style and speed of the background music gives a better feeling of the current situation, for example when enemies are close or time is running out.

Mock-Ups

Abbildung 1: WipeOut Pure

Abbildung 2: F-Zero GX, Gamecube

Abbildung 3: Extreme-G, Nintendo64

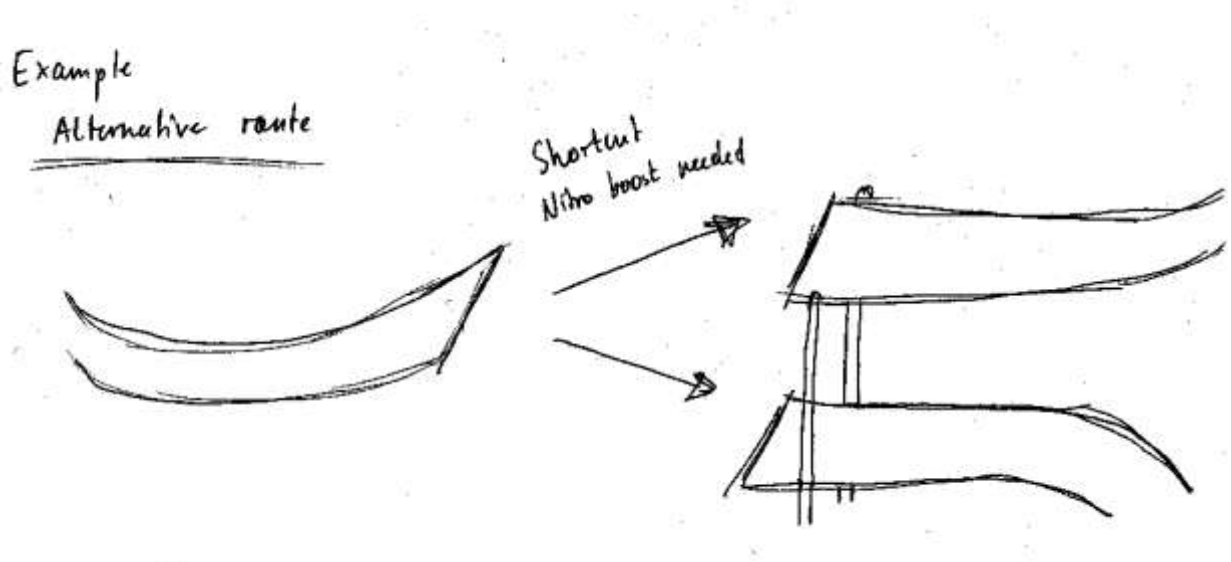

Abbildung 4: Shortcut illustration

Energy gun shot:

Missile:

Development Schedule

Layered Development Description

Functional Minimum:

Basic motion including collision detection with track boundaries. The user can drive a vehicle on something that looks like a racing track. The vehicle has an energy shield and power ups to refill the shield can be collected. Time will be measured. Nitro boost and nitro boost power ups to refill the nitro are included.

Low Target:

Cel-shading is implemented. The energy gun is implemented. Hitting another vehicle with an energy gun shot will damage that vehicle. Energy gun power ups to refill ammo can be collected. The track and vehicle models look acceptable, the track is not too simple.

Desirable Target:

Split screen support for two players, (dumb) AI allowing for computer controlled enemies. Sound effects and background music are included, background music does not adapt to the current situation. The rocket launcher and mines are included as well as the corresponding power ups. Motion blur shader effects.

High target:

Really cool, detailed and witty tracks, good AI. Background music adapts to the situation. Shaders for explosions and other effects.

Extras:

“Excellent” AI, particle effects like smoke, additional track/vehicles, background details for the track.

Detailed Schedule

	hours			
XNA (getting started)	10		5	
Pseudo Physics	40	P	> 40	We had to redo it twice; see interim report for details
Game Foundation	20	P	30	
Track/Vehicle Selection	10	P	15	
Track I	25	J	25	Basic round track
Track II (Blender vs. Maya)	25	J		
Vehicle	15	P	15	
Camera	15	P		
Pre-Alpha merging	10	P	10	
HUD	5	J	5	
Cel-Shading	30	J	30	
Motion Blur	15	J	5	
Shadow Map	15	J	15	
Particle Emitter	10	J	20	
Weapon	25			
AI	25			
Sound	30	P	15	
Split Screen	5	P	10	
Small Effects	20			

	3.4	10.4	17.4	24.4	1.5	8.5	15.5	22.5	29.5	5.6
							α		**β**	
Getting Started	J/P									
Pseudo Physics	P	P	P	P						
Vehicle			P	P						
Camera				P						
Cel-Shading	J	J	J			J/P				
Shadow Map				J						
Motion Blur				J						
Track			J	J			J	J		
Weapon							J/P	J/P	J/P	
AI								P	P	
Sound						P	P			
Split Screen						P	P			
Small Effects						J	J			
Presentation										
Play Test				J/P	J/P	J/P	J/P	J/P	J/P	J/P

Items marked in green-italic are completed

Assessments

The game should give the player the feeling of speed. Everyone who likes high-speed racing games or arcade racing games in general should like the game. Besides that it should look cool, of course. If the movable obstacles are included, it should also be fun to destroy and hit other vehicles and obstacles.

We will consider our game a success if it is fun to play and keeps the player coming back, entertaining him for more than just a minute or two. Additionally it should convincingly simulate speed.

Reports

[Moved to separate document]