

CS345/DIGM465: Computer Game Development: Understanding Torque



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Tribal Trouble, Gish, & ThinkTanks



Introduction

Cost: \$150-\$749

Royalties: None

- Scripting language: TorqueScript
- Full access to source (C++)
- Quickly maturing
 - Xbox and Wii Development
- Large community
- “Starter Kits” for FPS, MMO, Racing
- Integrated Editors
- Mature pipeline (Constructor, Showtool)
- Import from Maya, Max, SoftImage, Blender
Lightwave, Milkshape, Gamespace
- Large number of plugins
- Skybox and weather system
- Advanced shader support
- BSP/LOD
- Dynamic lighting
- Animation: Bone (+ blending)



Introduction

Family of Engines

- **Torque Game Engine (TGE)**
- Torque Engine Advanced
- Torque Game Builder (TGB)
- Torque X
- Torque Wii
- Torque 360



Introduction

Works on a client/server architecture

- Pros
 - Division of labor and resources
 - Easily adapt single player to multiplayer
 - Highly scalable (> 128 players)
- Cons
 - For single player games, unneeded duplication of objects and increased complexity

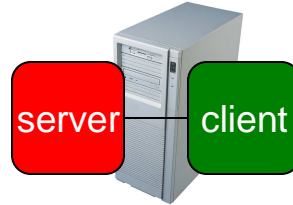


Introduction

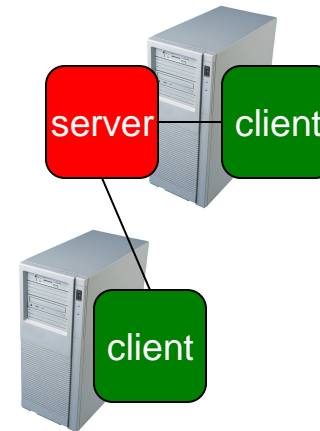
Works on a client/server architecture

Running modes for Torque

Single-player



Listen Server



Remote Client



Dedicated Server



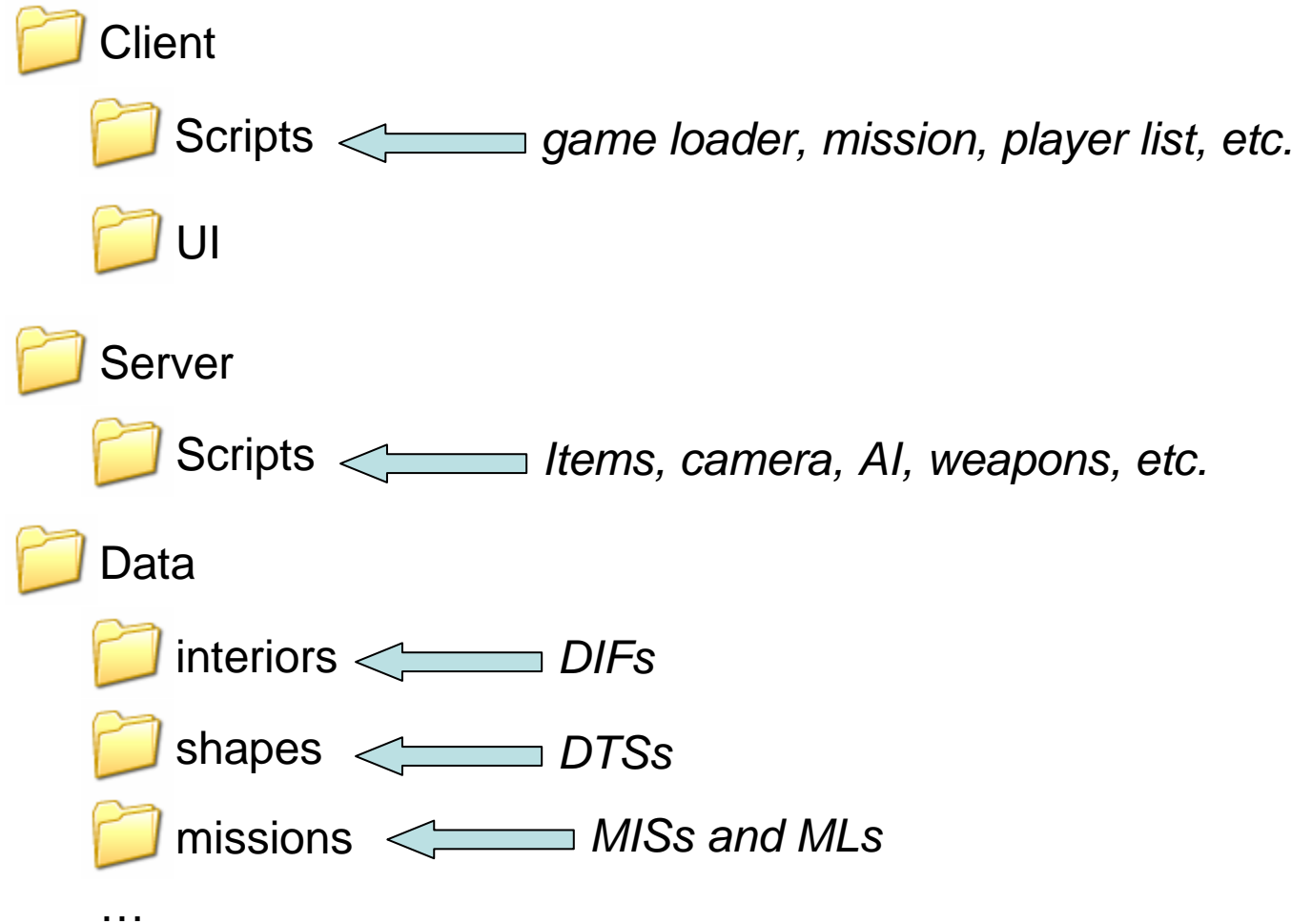


File Types

- **DTS**
 - 3D geometry (weapons, items, players, vehicles)
 - Can be animated
- **DSQ**
 - Animation thread
 - Can be blended with other DSQs
 - Usually only used for character animation
- **DIF**
 - Interiors and structures
 - Can not be animated
- **GUI**
 - Create HUD objects
- **MIS**
 - Mission file
 - contains object locations
- **ML**
 - Lighting
 - Created automatically
- **CS**
 - TorqueScript file (editable)
- **DSO**
 - Compiled TorqueScript file



The Folder Structure



TorqueScript



Tribal Trouble, Gish, & ThinkTanks



TorqueScript

- String, file, vector, and math libraries
- Supports inheritance and polymorphism
- Namespaces
- Compiled at runtime



TorqueScript

Caveats

- Type-insensitive ("1.2" == 1.2)
- Case-insensitive (\$a == \$A)
- %local_variable
- \$global_variable
- @: concatenation
- Arrays: indices can be accessed with or without []
 - **\$array[1] == \$array1**
 - **\$array[2,3] == \$array2_3 // multidimensional**



TorqueScript

Core Classes

- **SimObject**
 - root class, controls ID, name, memory allocation, etc.
- **SceneObject**
 - transforms, collisions, coords in local/world space
- **GameBase**
 - ticks, datablocks



TorqueScript

Game Classes

- **ShapeBase (Virtual Parent Class)**
 - Rendering
 - Damage
 - Characteristics for physics calculations
 - Animation
 - Sound
 - Mounting
- **Item**
- **StaticShape**
- **TSSStatic**
 - Basic rendering/collision only
- **ShapeBaseImageData**
 - Lightweight for network
 - Mountable to ShapeBase
 - No collisions
 - State machines



TorqueScript

Gameplay Classes

- Camera
- Player
- Vehicles
 - WheeledVehicle
 - HoverVehicle
 - FlyingVehicle



TorqueScript

Mission Objects

- **Terrain**
 - Texture LOD
 - Bumpmapping
- **Water**
 - Density, viscosity
- **Sky**
- **Weather**
- **Audio**
 - 2D/3D
- **Particle Emitters**
- **Foliage**
- **Paths**
- **Triggers**

Creating Assets

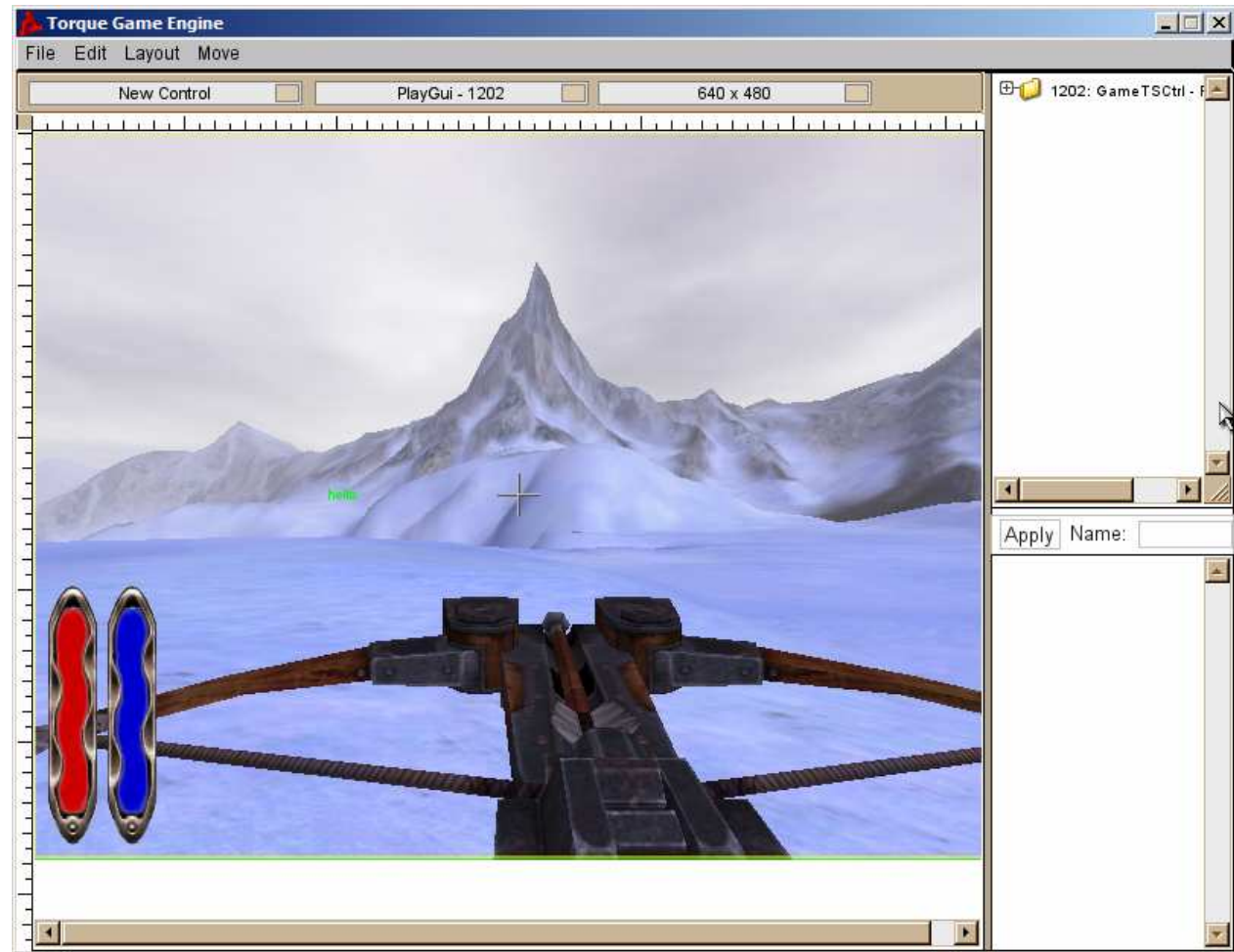


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Editors (In Game)

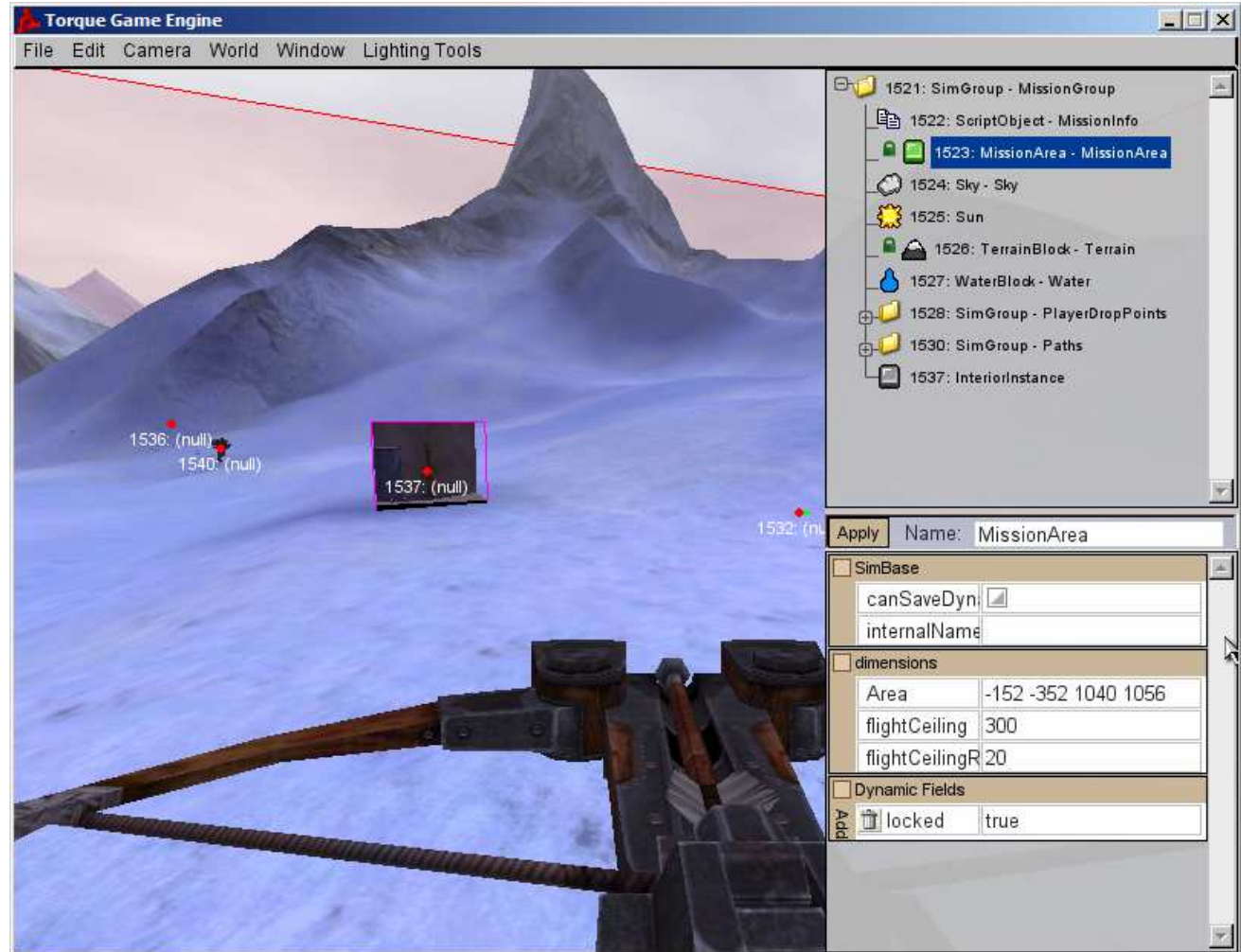
HUD (F10)





Editors (In Game)

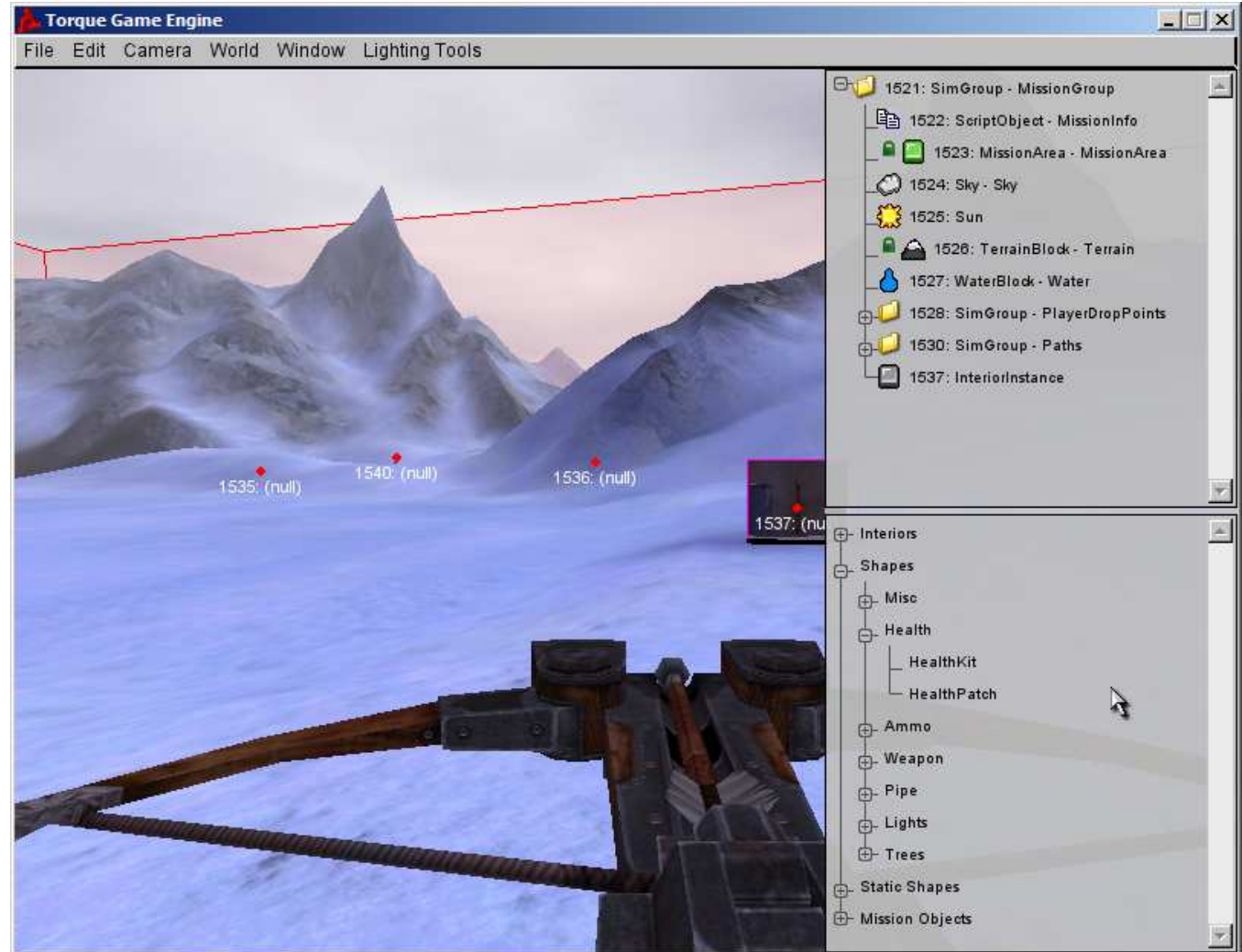
World Editor - Inspector (F11 + F3)





Editors (In Game)

World Editor - Creator (F11 + F4)





Editors (In Game)

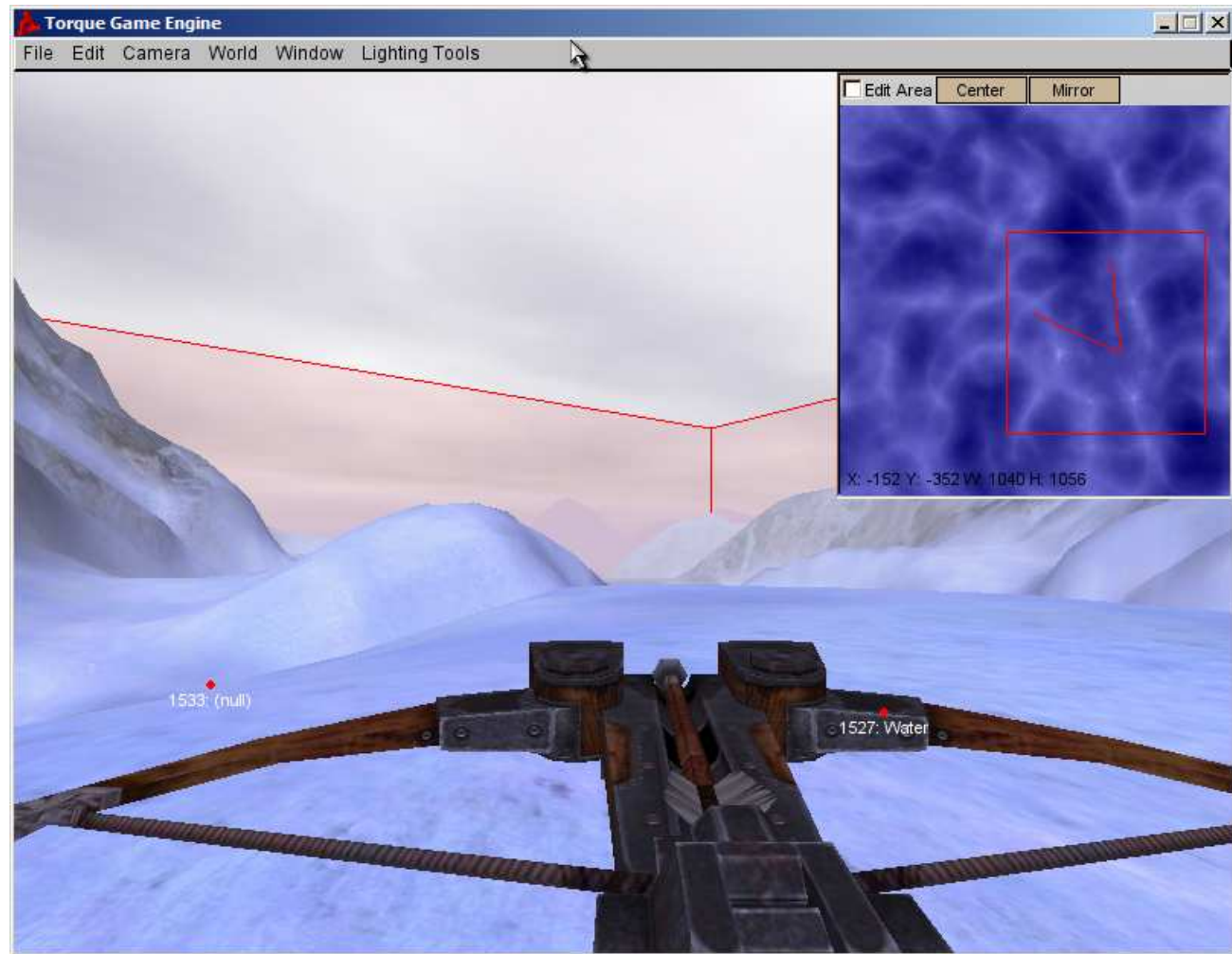
World Editor – Lighting Kit (F11 + F12)

The screenshot displays the Torque Game Engine interface. The main window shows a 3D environment with a mountain range and a snow-covered ground. A red laser line is visible in the sky. The interface includes a menu bar (File, Edit, Camera, World, Window, Lighting Tools) and a toolbar. The right side features a Hierarchy panel with a tree view of objects, including 1521: SimGroup - MissionGroup, 1522: ScriptObject - MissionInfo, 1523: MissionArea - MissionArea (highlighted), 1524: Sky - Sky, 1525: Sun, 1526: TerrainBlock - Terrain, 1527: WaterBlock - Water, 1528: SimGroup - PlayerDropPoints, 1530: SimGroup - Paths, and 1537: InteriorInstance. Below the Hierarchy panel is a Properties panel for the selected MissionArea, showing fields for Name (MissionArea), SimBase, canSaveDyn, internalName, dimensions (Area: -152 -352 1040 1056, flightCeiling: 300, flightCeilingR: 20), and Dynamic Fields (locked: true). The bottom left corner shows the Torque Lighting Kit Light Editor, which includes a menu bar (File, Editor, Quality, Relight), a Light DB field, a table with columns Type, Color, Flare, and Animation, a Lighting Model field, a grid of checkboxes for various lighting options (Enabled, Static, DTS Objects, Shadows, Restrict Diffuse To Zone, Restrict Ambient To Zone, Two Sided Ambient, Spotlight, Smoothing), a Radius field, and a Filter Radius field set to 60.



Editors (In Game)

World Editor – Mission Area (F11 + F5)





Editors (In Game)

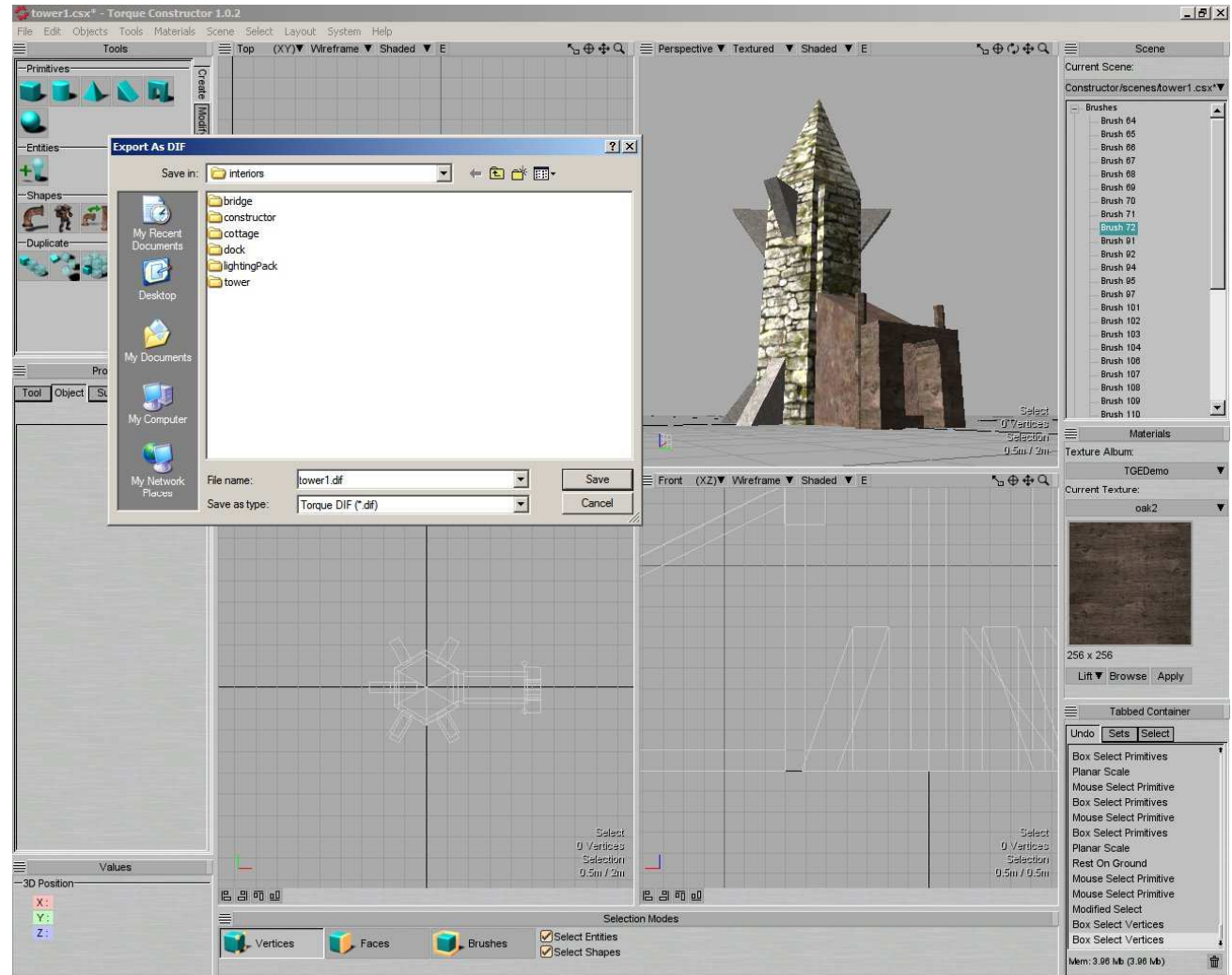
World Editor – Terrain Editor (F11 + F6)





Editors (Out of Game)

Constructor





Editors (Out of Game)

Many Popular 3D Modeling Packages

- 3DS Max (up to version 8)
- Maya (up to version 7)
- Lightwave (7.5+)
- Blender (2.33+)
- MilkShape (1.7.0) *included*
- GameSpace (1.5) *included*



Creating Assets

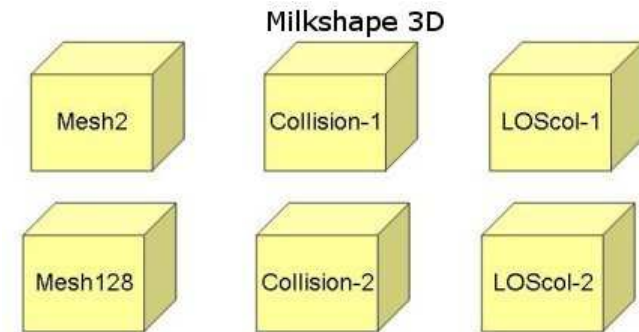
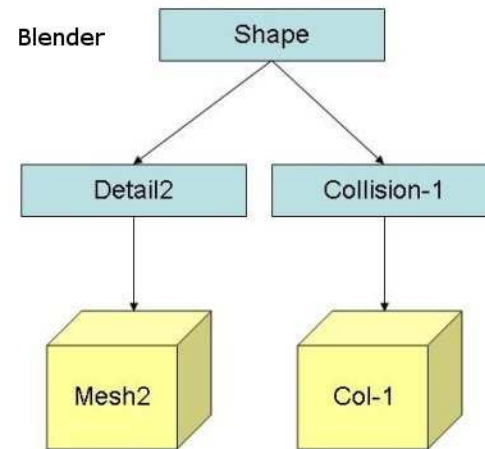
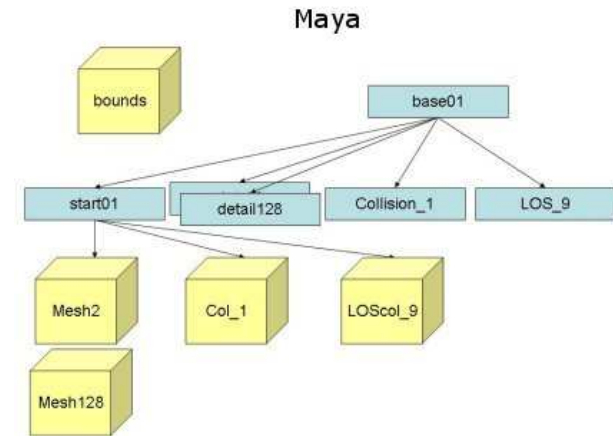
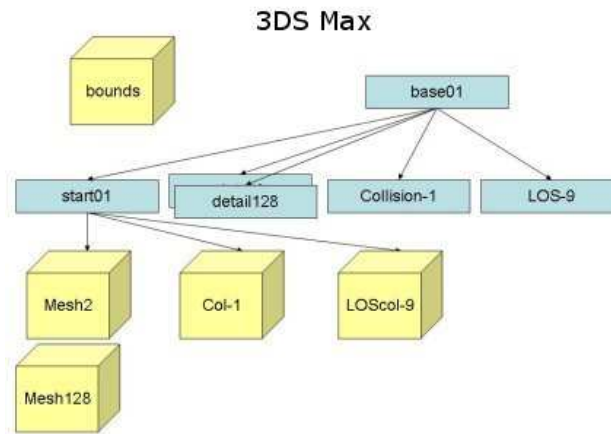
DTS Objects

- Watch your poly counts
 - Characters: 2250 polygons
 - Vehicles: 1500 polygons
 - Weapons: 500 polygons
 - Other Objects: <400
 - Collision Geometry: 10-30 polygons
- Textures
 - Must be sized in powers of 2 (32, 64, 128, etc.)
 - Do not have to be square
 - Maximum texture size is (512x512) – **use rarely**
 - GIF/PNG/JPEG
- Scale
 - 1 3DSMax Unit/1 Maya Meter = 32 Quark Units
= 1 Torque Unit
- Modeling
 - Can be comprised of either single/multiple objects
 - Must be converted to poly mesh before export



Creating Assets

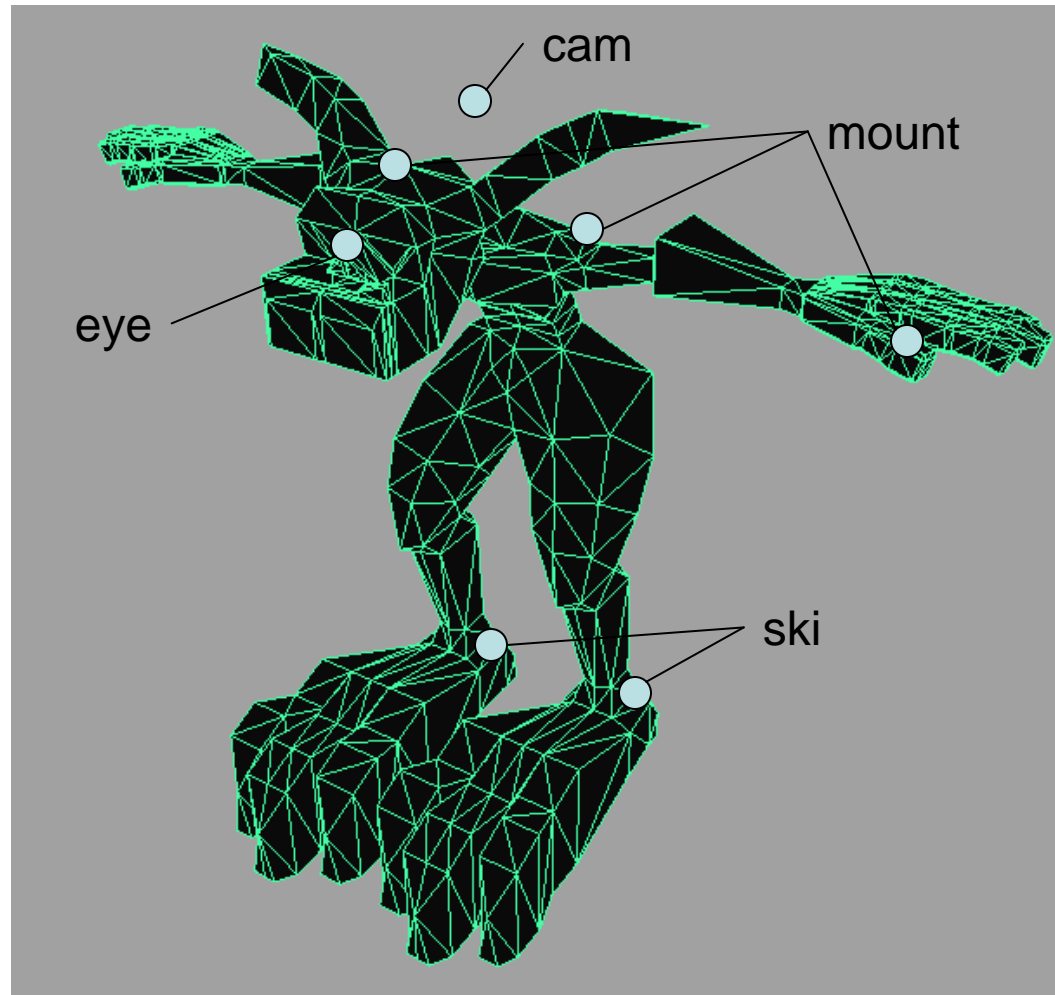
- **Preparing for export**
 - Each package has it's own way of creating the scene tree





Creating Assets

- **Preparing for export**
 - Special nodes exist for characters & vehicles



A complete reference can be found here: http://fosters.realmwarsgame.com/tools/DTS_Nodes.pdf