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Software Engineering

Final Project: Babylon

World (True: things everyone takes for granted)

What are the essentials of a Web rendering engine? Why was this platform made? What market is it for and what are the essential core values?

Similar Programs: Godot Engine, Unity, Unreal Engine, GDevelop, Cryengine

1) Open and free for everyone
2) A way to create 3D models and animations
3) Fully supported by WebGPU
4) Easy to use full featured viewer
5) Provides cross-platform developing/ Native hosting

A complete JavaScript framework for building 3D games with HTML5, WebGL and Web Audio

Requirement (System Domain: User Language need)

1) Tool integration with other platforms
2) Supports left and right handed systems.
3) Shortcut Set for easier access in GUI editor
4) Provides Anti-Aliasing for fixing problematic textures
5) Audio engine based on Web Audio API
6) Provides a collision engine
7) Physics engine based on Oimo.js, ammo.js and cannon.js
8) Easy way to change scenes
9) Accelerated 2D controls
10) Provides particle systems
11) Makes easy to create spread sheets
12) Powerful Asset Libraries (More in specification section)
13) Proper Additional Documentation Website with Feedback and Response Sections
14) Default Templates and Repositories
15) User Manual and Tutorials hosted on website

Specification (Computer Domain: Technical elaboration)

1) Provides cross-platform developing/ Native hosting: Live Web Updating Service also available on website. initial web hosting contract assumed to be 10 years.

   a) iOS
   b) Android
   c) MacOS
   d) Win32
   e) UWP
2) Tool integration with other platforms
   a) 8th Wall
   b) Blender
   c) Unity
   d) AutoDesk 3DS Max
   e) Maya
   f) Clara.io
3) Asset Libraries included are
   a) The Meshes Library
   b) The Texture Library
   c) Materials Library
   d) Post Process Library
   e) Procedural Texture Library
4) Exporters and tooling
   a) Exporters for glTF, OBJ and Babylon file formats
   b) Importers for glTF, STL, OBJ and Babylon file formats
   c) Support for drag'n'drop
   d) Inspector
   e) Assets manager
5) Cameras
   a) Universal camera (keyboard/touch/gamepad)
   b) Arc rotate camera
   c) Free camera
   d) Touch camera
   e) Virtual Joysticks camera
   f) WebVR camera
   g) Gamepad camera
   h) VR Device Orientation camera for Cardboard
   i) Follow camera
   j) Anaglyph camera
6) Special fx
   a) Fog
   b) Alpha blending
   c) Alpha testing
   d) Billboarding
   e) Fullscreen mode
   f) Shadow Maps and Exponentatial Shadow Maps (including soft shadows with PCF and PCSS)

   g) Cascaded Shadow Maps
   h) Post-processes
   i) Depth of field
   j) Image processing
   k) Bloom
   l) Grain
   m) Anti aliasing
   n) Sharpening
   o) Screen space reflections
   p) Rendering layers
   q) Lens flares
   r) Reflection Probes
   s) Edges renderer
   t) Multi-views
   u) Highlights rendering
   v) Glow layer
   w) Navigation mesh and crowd of moving agents
7) Optimizations
   a) Frustum clipping
   b) Sub-meshes clipping
   c) Hardware scaling
   d) Occlusion queries
   e) Selection octrees
   f) Offline mode (Assets saved in IndexedDB)
   g) Incremental loading
   h) Binary compressed format
   i) Hardware accelerated instances
   j) Automatic scene optimizer
   k) LOD (Level Of Details)
   l) Meshes merging
   m) Offscreen canvas
   n) Engine sharing over multiple canvases
8) Meshes
   a) Mesh cloning
   b) Dynamic meshes
   c) Decals
   d) Height maps
   e) Skeletons and bones
   f) Parametric shapes (Ribbon, tubes, etc.)
   g) Morph targets
   h) Dynamic mesh simplification
   i) Constructive Solid Geometries
9) Shaders / rendering

a) Node Material
b) Physically Based Rendering (PBR)
c) Clear coat
d) Sheen
e) Diffuse lighting and texture
f) Ambient lighting and texture
g) Specular lighting and texture
h) Opacity texture
i) Mirror texture
j) Emissive texture
k) Bump texture
l) Lightmap texture
m) Unlimited lights (points, directionals, spots, hemispherics)
n) Light texture projection
o) Skybox
p) Vertex color
q) Up to 8 bones per vertex
r) Morphing
s) Render target textures
t) Dynamic textures (2D canvas)
u) Reflection texture (Spheric, planar, cubic, projection and equirectangular)
v) Video textures (including from webcam)
w) Compressed (DDS, KTX, .basis) textures & TGA
x) 360 photos and videos
y) Procedural textures library
z) Materials library