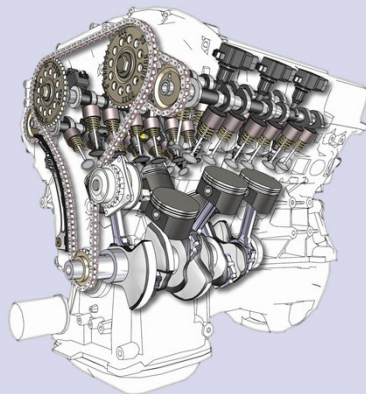


Master Game Dev
Verona, 2014-2015
Game Engines

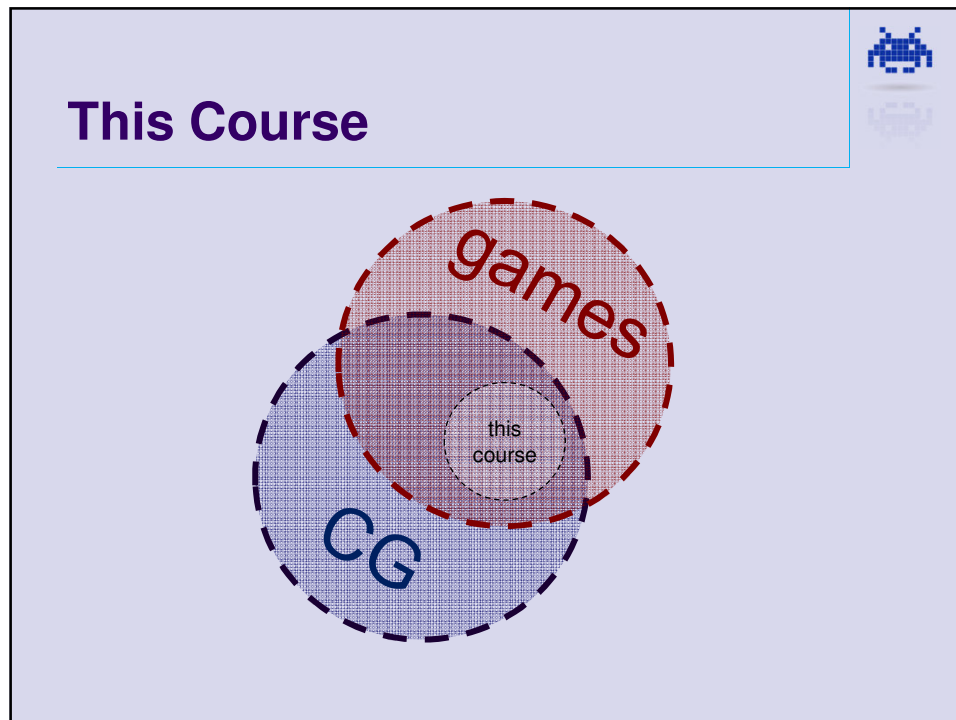


Marco Tarini

General info



- Marco Tarini
 - Google for “marco tarini”, 1st link
 - Follow “teaching” (bottom)
 - Follow “Master Computer game dev 2015”:
pagina del corso: materiale, lucidi, links.
 - Follow “contact” (bottom)
 - Mail, tel, etc...



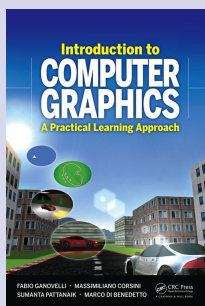
Possibili testi di riferimento (1/3)

Game Engine Architecture
Jason Gregory
Abb. completo (con cenni di:
software tools, software eng., AI prog, CG prog, math,
game design...)

Mathematics for 3D Game Progr. and C.G.
(3za ed)
Eric Lengyel
Copre bene il lato + tecnico: 3D math, CG pipeline, geometry
+ transforms, raytracing, visibility, physic sims, semplice
geom processing...



Possibili testi di riferimento (2/3)



Introduction to **Computer Graphics** a practical Learning Approach

Ganovelli, Corsini, Pattanaik, Di Benedetto

Tutto sulla CG, cenni di CV. Javascript + WebGL (+ GLSL).
Pratico. Accento sui games!



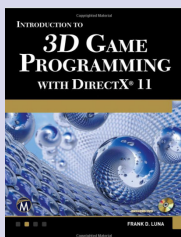
Possibili testi di riferimento (3/3)



Game **Coding Complete** (4ta ed)

Mike McShaffry, David Graham

Visione pratica (attenzione a osolescenza)
Accento su coding, software eng (es memory
managment).

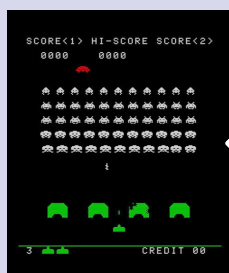


Introduction to **3D Game Programming** with DirectX 11

Frank Luna

Rendering / GPU (in pratica, copre il corso di CG)

Video Games (Interactive Electronic Entertainment)



"Space Invaders"
(Taito, 1978)

~35 anni



"The Last of Us"
(Naughty Dog, 2013)

Categorie: per gameplay



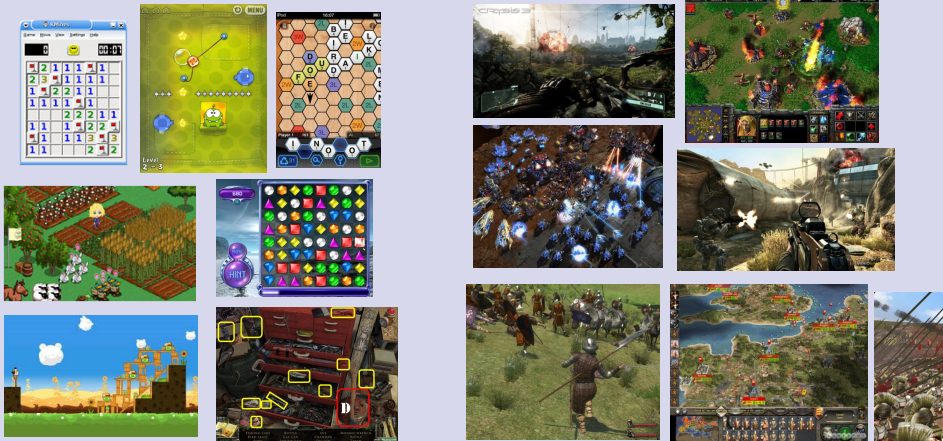
- Puzzle game
 - Color matching
 - Hidden object
 - Trivia game ...
- Action game
 - Beat'em up / hack'n'slash
 - Fighting
 - Pinball
 - Platform
 - Maze
 - Shooter
 - FPS
 - MMO FPS
 - LightGun
 - Shoot'em up
 - Rail shooter
 - 3rd person
- Action-Adventure
 - Stealth
 - Survival horror
 - Exploration
 - PoP / Tombrider
- Adventures
 - IF - Interactive Fiction
 - Real time 3D adv
 - Text
- Board game
 - Card games ...
- Strategy
 - 4X
 - RTS
 - MOBA / MMOG Strategy
 - Action-RTS
 - Tower defences
- Vehicle simulation
 - Driving simulator
 - Flight simulator
 - Amateur
 - Combat
 - Space ...
 - Racing game
 - Vehicular combat
- Role-playing games
 - RPG (occidentali, orientali)
 - Sandbox RPG
 - MMOPRG
 - Roguelikes
 - Action RPG
 - Fighting game
- Sport games
- Simulation / management

Categorie: per fasce utenti

casual games

vs

hard core games



Categorie: per piattaforma

- Arcade
- PC stand-alones
 - Aka “desktop app”
 - (“computer game” propriamente detto)
 - Win, Mac, Linux...
- Console
 - Wii, PS, XBox ...
- Browser
 - html5, webGL, unity, flash...
- Mobile devices
 - Android, iDevices, PSP ...

Categorie: per sviluppatore

Independent games

- No/small publisher:

Mainstream games

- Big publisher



cosa fa un video-game publisher?

• Tasks:

- finanzia lo sviluppo
 - compreso licenze
- distribuzione
- marketing
 - pubblicità, lancio, ricerche di mercato...
- packaging, manuali
- localization

• Alto rischio




Categorie: per sviluppatore

Independent games

- No/small publisher
- Low starting \$
- Team piccoli
- + libertà +innovazione
 - (spesso)
- Strade alternative per:
 - Funding
per es: Crowd funding
 - come indiegogo.com, kickstarters.com, ...
 - Distributing
 - es: steam, popcap, apple store...

Mainstream games

- Big publisher
- Big \$ per project
 - (spesso, mega-\$'s)
- High quality: imperativa
- Dev-teams grandi



Categorie: per tecnologie video usate

2D games

- Sprites + Tilemap / Tilesets

3D games

- Modelli + Scene 3D



TileSet



TileMap



Sprites

Categorie: per tecnologie video usate



2D games

- Sprites + Tilemap / Tilesets
- Tecnologie:
 - «Blitting»
 - Tilemap rendering
 - e 2D scrolling
 - Funzionalità sprite
 - sprite collision detection («pixel perfect»)
 - 2D transforms
 - Transparency, z-ordering...
 - 2D physical engines (a volte)

3D games

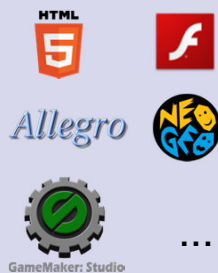
- Modelli + Scene 3D
- Tecnologie:
 - 3D Modelling
 - Scenograph, models
 - 3D Real time rendering
 - trasformazione 3D
 - Illuminazione,
 - 3D animations
 - Cinematica, motion capture, model animations...
 - 3D physical simulations
 - (3D sound localization)

Categorie: per tecnologie video usate



2D games

- Sprites + Tilemap
- Tecnologie:



3D games

- Modelli + Scene 3D
- Tecnologie:



(NB: parliamo di engine non di gameplay)

2D engine



3D engine



2D gameplay



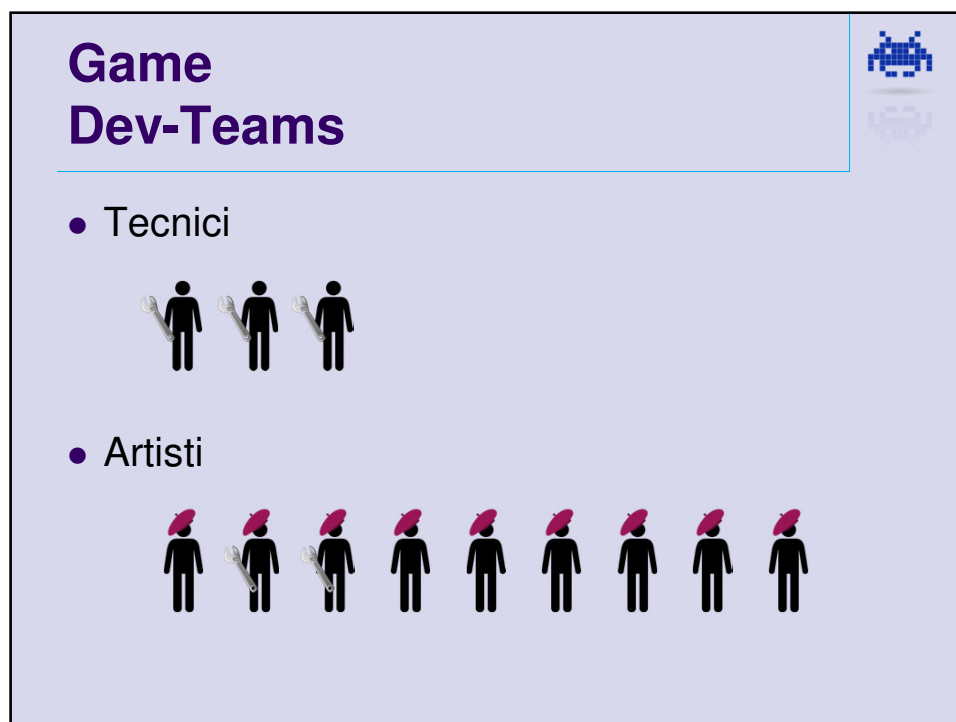
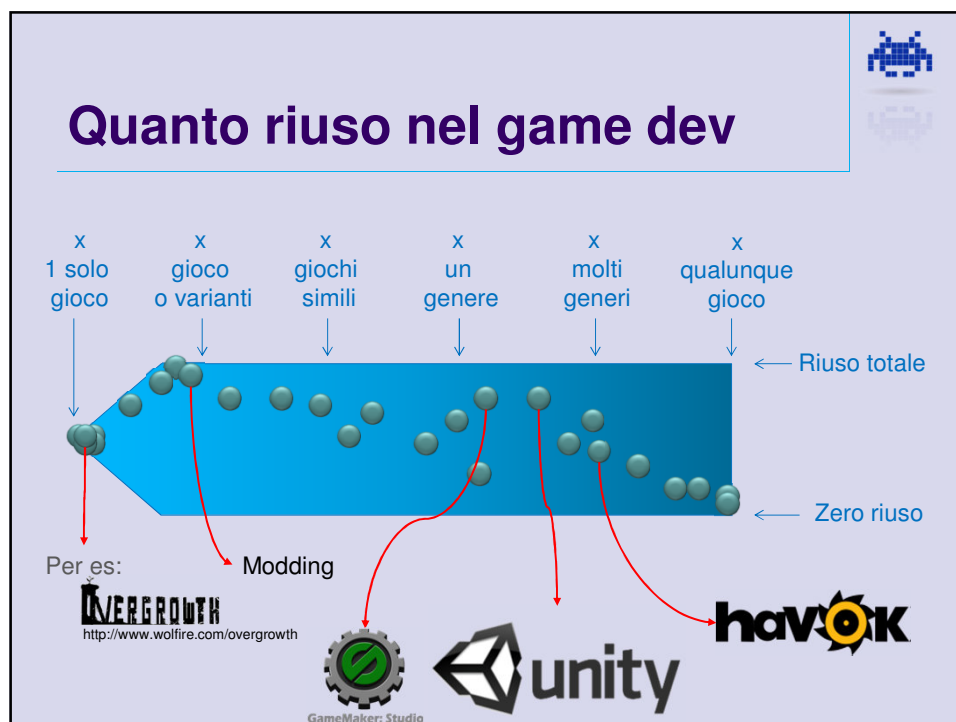
3D gameplay



Game Dev

- Task comuni affrontati
 - Rendering
 - Real time transform + lighting
 - Physics
 - Newtonian physical simulations
 - Collision detection + response
 - Networking
 - Sound rendering
 - Input managing
 - Struttura del programma
 - Loop di gestione degli eventi
 - Memory management
 - Artificial intelligence
 - Sotto task comuni:
 - Struttura generale
- +Animations
scripted or computed

riuso!



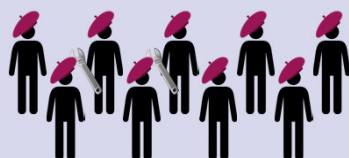
Game Dev-Teams



- Tecnici



- Artisti

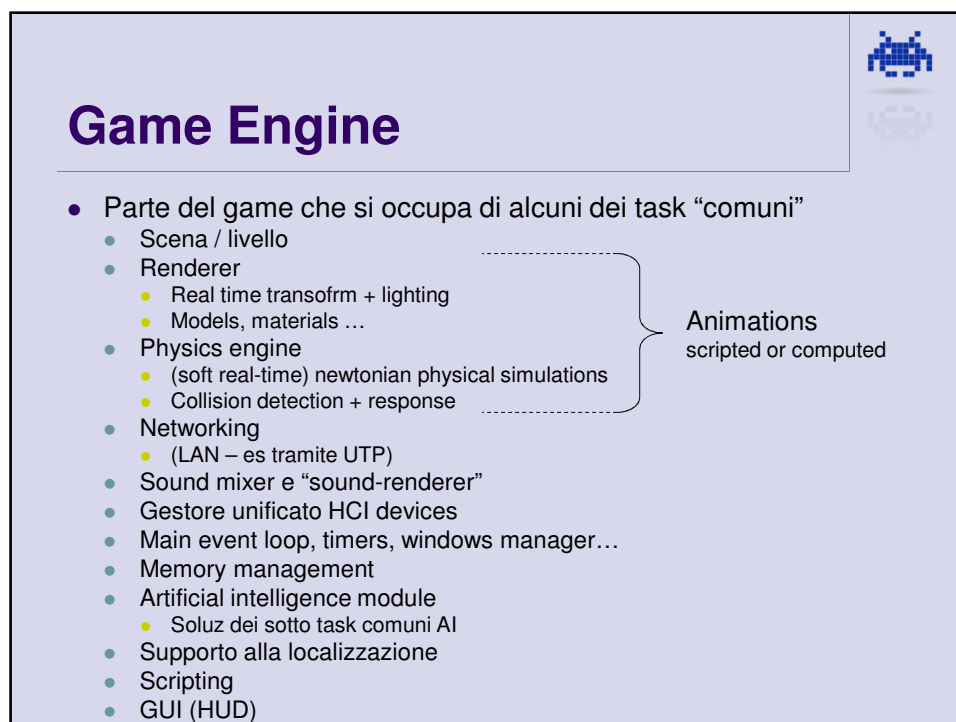
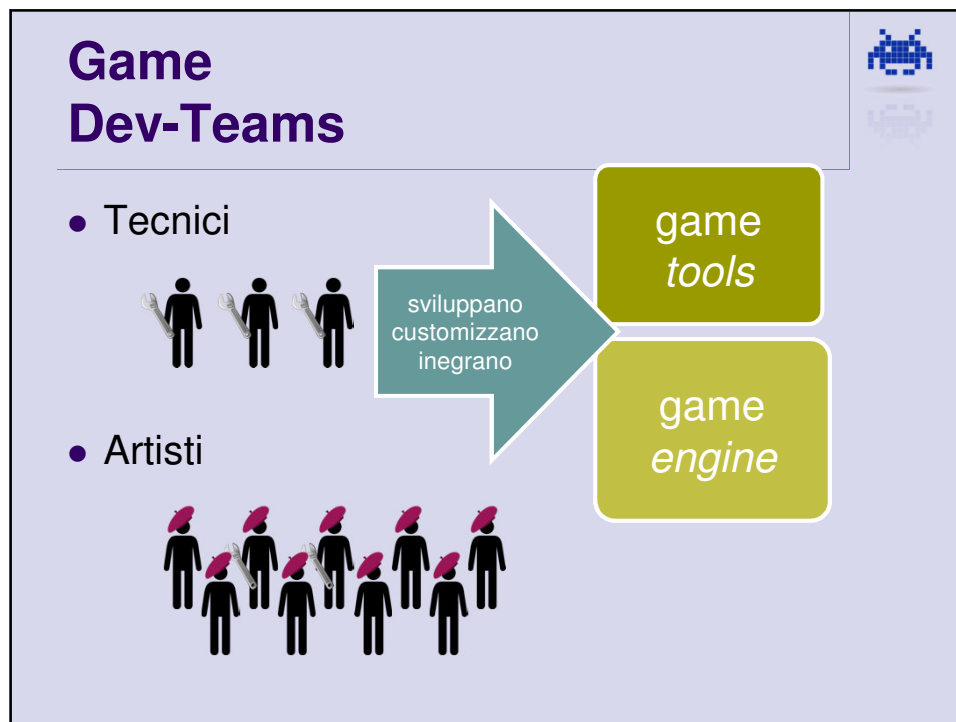


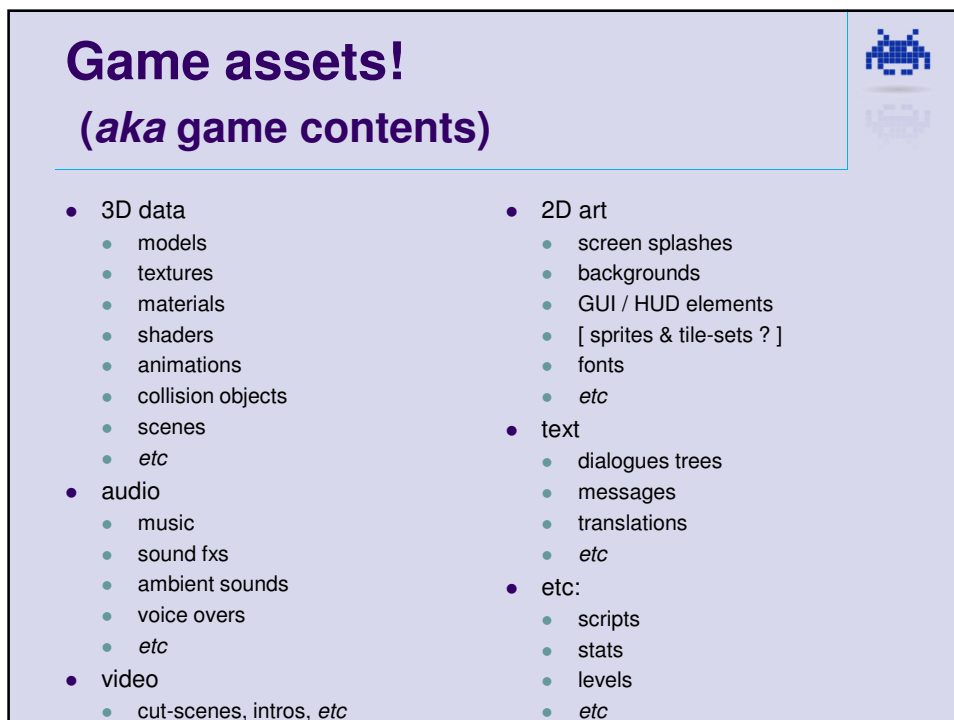
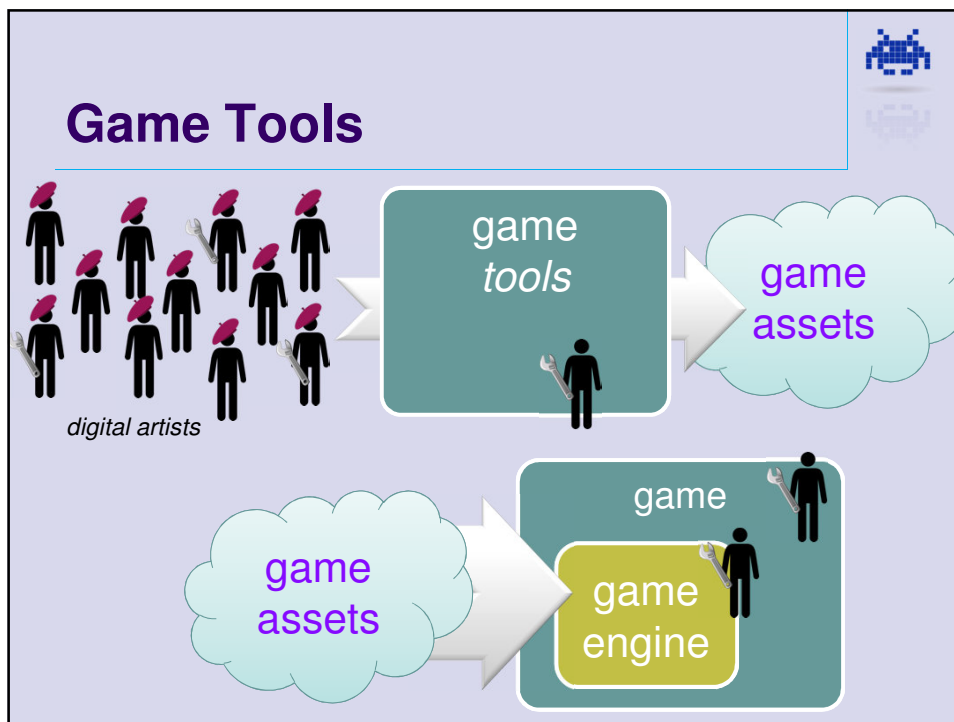
game
assets

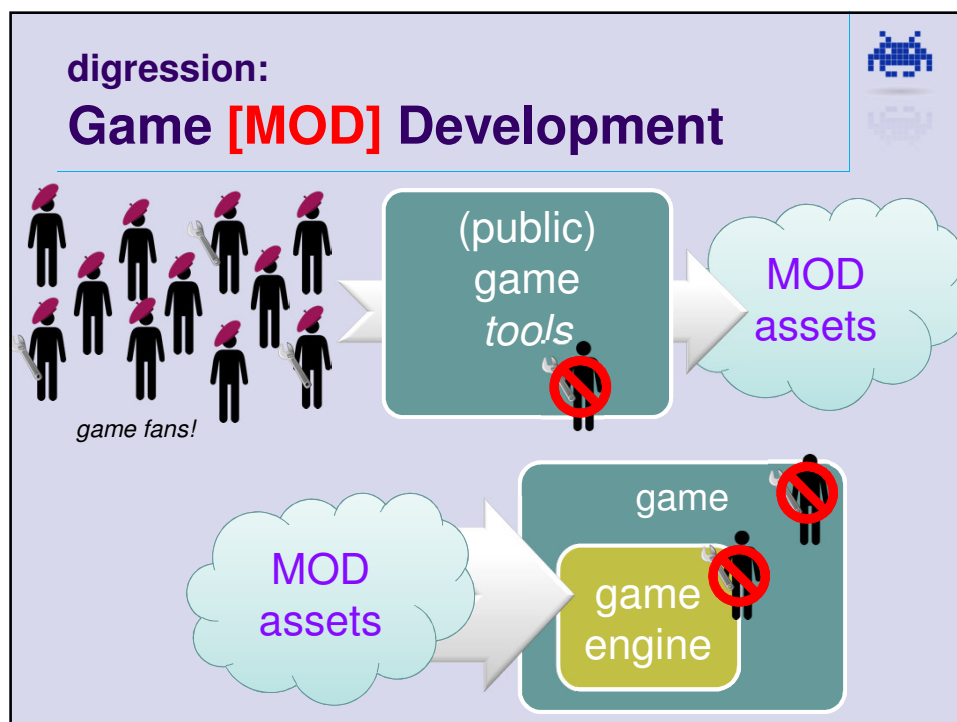
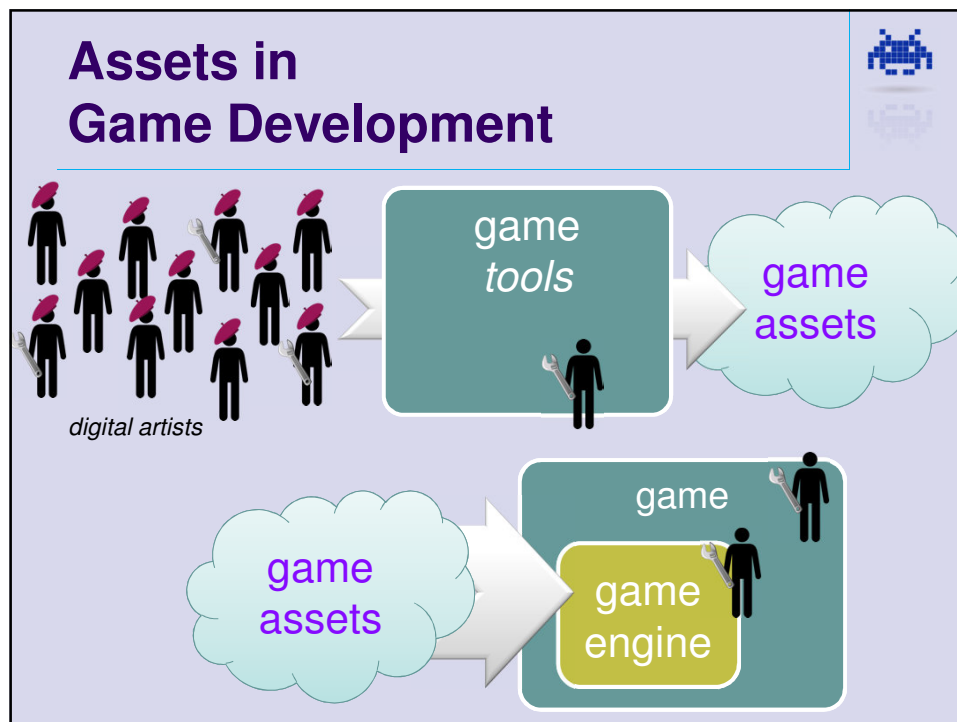
Intro: game assets! (aka game contents)



- 3D data
 - models
 - textures
 - materials
 - shaders
 - animations
 - collision objects
 - etc
- audio
 - music
 - sound fxs
 - ambient sounds
 - voice overs
 - etc
- video
 - cut-scenes, intros
 - etc
- 2D art
 - screen splashes
 - backgrounds
 - GUI / HUD elements
 - [sprites & tile-sets ?]
 - fonts
 - etc
- text
 - dialogues trees
 - messages
 - translations
 - etc
- etc:
 - scripts
 - stats
 - levels
 - etc







Game assets! (aka game contents)



- **3D content**
 - models
 - textures
 - materials
 - shaders
 - animations
 - collision objects
 - scenes
 - etc
- audio
 - music
 - sound fxs
 - ambient sounds
 - voice overs
 - etc
- video
 - cut-scenes, intros
 - etc
- 2D art
 - screen splashes
 - backgrounds
 - GUI / HUD elements (e.g. buttons, bars),
 - [sprites & tile-sets ?]
 - fonts
 - [concepts]
 - etc
- text
 - dialogues trees
 - messages
 - translations
 - etc
- etc:
 - scripts,
 - stats,
 - levels...

Parte 3D dei game assets



- **3D Models**
i.e. tri-meshes with:
 - per vertex attrib
 - normals, color, AO, ...
 - LODs
 - "uv-mapping"
 - keyframes
 - cyclic animations
 - face-morphs, ...
 - "skinning"
- **Materials**
 - lighting model stats / flags
 - textures
 - RGB maps
 - normal maps
 - alpha maps ...
 - shaders
 - vertex, fragments, ...
- **Animations**
 - blend shapes
 - skeletal animations
 - kinematic animations
 - geometry caches
- **Skeletons (rigs)**
- **Collision objects**
 - hit-boxes
 - bounding objects
- **Particle systems**
- **Environments**
 - 3d scenes
 - skydomes
 - env. maps
 - scene props