Computer games Development

Introduction

About me

- ○ Rosenheim:
  - ➢ Laboratory for Human Machine Interaction
  - ➢ Coach for VR/AR and MR
- ○ Nuremberg:
  - ➢ PhD Student in Visual Computing
- ○ Other:
  - ➢ Technical Director at Rabbithill Games U.G.

Andreas Magerl

I also offer bachelor thesis topics.

About this class

Exam: Project (small game) PstA

Each project:

- 1-3 Project members
- creating a small game (like in a game jam)
- with a presentation at the end of the semester about the lessons learned
  - ➢ each project member is supposed to talk about two challenging aspects of the project.
  - ➢ the talking points should have something to do with game development specifically
  - ➢ (do not whine about how tough the task was. I want you to talk about how you handled the challenge)
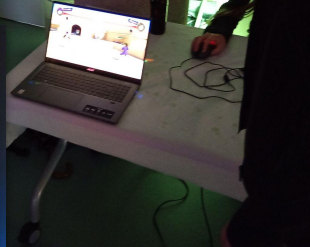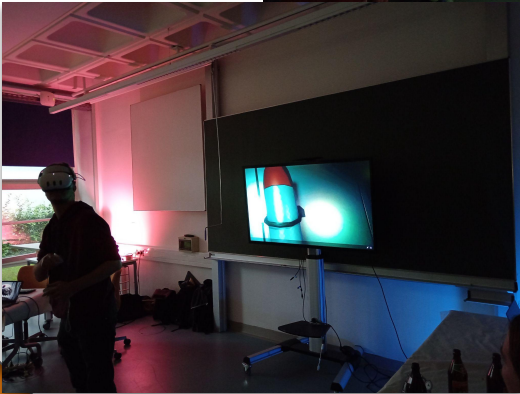
Games from last year

Goal: 15
Emeralds

Emeralds: 6
Gold: 10

Coins: 1820   Unit Capacity: 13/18

Barrack   Mine   Bank

About this class: schedule

1. **First few weeks:** fundamentals of practical game development
2. **Around 15. of April:** Presentation of Game Ideas.
3. **Lessons** will be about concepts in game development, exercises will be partly show and tell and partly support sessions
4. **Middle of June:** internal playtesting opportunity in class
5. **Around the end of June:** (hopefully) playtesting evening event with pizza, drinks, and guests.
6. **Last lesson:** presentations and grades

Playtesting Events

Topics

1. History of Games (quick walkthrough: this is today) and genres
2. Game Design
   ➢ Very basic walkthrough to get you started
3. Game Engine
   ➢ Information about how the engine works
   ➢ Get a feeling for what is happening
4. Artificial Intelligence
   ➢ Turn based games
   ➢ Pathfinding and Meshes
5. Rendering in Games
   ➢ 3D Models, how they work and how to get decent performance
6. Online Multiplayer (not directly relevant for this class, but nice to know)

Definition of what a computer game is:

A computer game needs to have some form of computation behind it and can therefore only be played on a computer of some sort (but does not necessarily output a video signal in the general sense).

A video game needs to display its information to the player using raster video equipment (but does not necessarily need computation).

(Most of the following information is copied from pong-story.com)

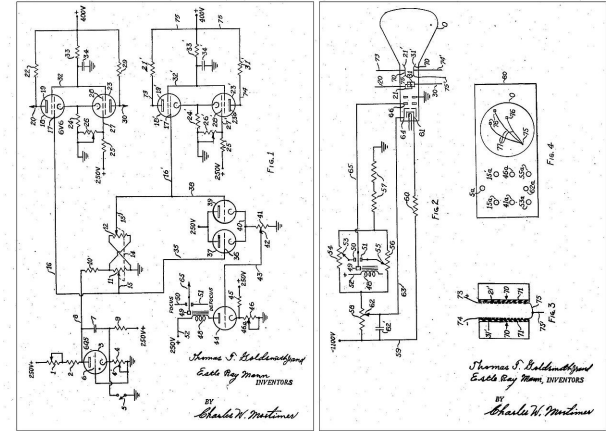# First electronic game using a screen   1947

Inventors: Thomas T. Goldsmith and Estle Ray Mann

Function:

Graphics are attached to the CRT Display;
the beam is directed to a point and controlled by
the player;
this represents a bullet or missile

⇒ not a video game, as it does not generate
a video signal, only a dot.

https://en.wikipedia.org/wiki/Cathode-ray_tube_amusement_device

First video game   1951

Inventor: Ralph Bear

Working at Loral (TV Company) to develop the best television set in the world.

The concept was not understood and thrown out.

(Was later revisited by Baer in 1966)

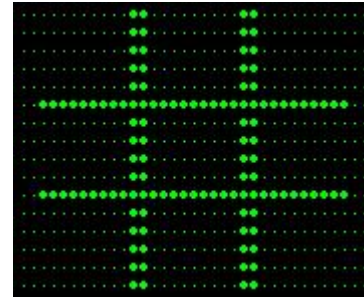# First computer game   1952

Inventor: A.S. Douglas at the University of Cambridge

Tic, Tac, Toe against a computer player:

35 x 16 dots

EDSAC vacuum-tube computer

Tennis for Two

Inventor: Willy Higginbotham

2 player computer game

Analog Donner computer

Oscilloscope as a display

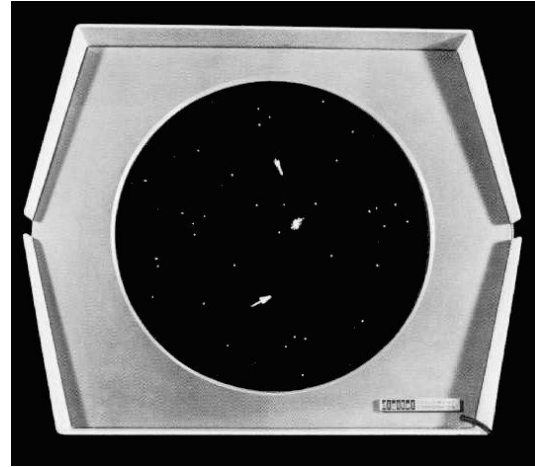https://www.youtube.com/watch?v=6PG2mdU_i8k&ab_channel=WilliamHunter

Inventors: Martin Graetz, Stephen Russell and Wayne Wiitannen; MIT

System:

DEC PDP-1 Computer
Visualization with vector graphics

http://www.computerspacefan.com/SpaceWarSim.htm

Further history

2004 Documentary about video games, moderated by Tony Hawk.

It is not complete, not 100% accurate, but overall an interesting documentary

Overview game genres

- Action
- Adventure
- Role-Playing
- Strategy
- Simulation
- Sports & Racing

- Fighting
- Horror
- Puzzle
- Party & Casual
- Sandbox & Open World

Action

- **First-Person Shooter (FPS)**
  - *Doom*
  - *Call of Duty*
  - *Counter-Strike*
- **Third-Person Shooter (TPS)**
  - *Gears of War*
  - *Max Payne*
  - *Uncharted*
- **Platformer**
  - *Super Mario*
  - *Celeste*
  - *Hollow Knight*

- **Beat 'em up / Hack and Slash**
  - *Devil May Cry*
  - *Streets of Rage*
  - *Bayonetta*
- **Stealth**
  - *Metal Gear Solid*
  - *Splinter Cell*
  - *Hitman*
- **Battle Royale**
  - *Fortnite*
  - *PUBG*
  - *Apex Legends*

Adventure

- **Point-and-Click**
  - *Monkey Island*
  - *Grim Fandango*
- **Interactive Fiction / Visual Novel**
  - *Doki Doki Literature Club (NOT Monika)*
  - *Phoenix Wright*
- **Walking Simulator**
  - *Firewatch*
  - *What Remains of Edith Finch*

Role-Playing

- **Western RPG (WRPG)**
  - *The Elder Scrolls*
  - *Fallout*
  - *Baldur's Gate*
- **Japanese RPG (JRPG)**
  - *Final Fantasy*
  - *Persona*
  - *Dragon Quest*
- **Action RPG**
  - *Dark Souls*
  - *The Witcher 3*
  - *Elden Ring*

- **Tactical RPG (SRPG/TRPG)**
  - *XCOM*
  - *Fire Emblem*
  - *Divinity: Original Sin*
- **MMORPG**
  - *World of Warcraft*
  - *Guild Wars*
  - *Final Fantasy XIV*

Strategy

- **Real-Time Strategy (RTS)**
  - *StarCraft*
  - *Age of Empires*
  - *Command & Conquer*
- **Turn-Based Strategy (TBS)**
  - *Civilization*
  - *Heroes of Might and Magic*
- **Tower Defense**
  - *Plants vs. Zombies*
  - *Bloons TD*

- **4X (Explore, Expand, Exploit, Exterminate)**
  - *Sid Meier's Civilization*
  - *Stellaris*
- **Auto Battler**
  - *Teamfight Tactics*
  - *Dota Underlords*

Simulation

- **Life Simulation**
  - *The Sims*
  - *Animal Crossing*
  - *Stardew Valley*
- **Vehicle Simulation**
  - *Microsoft Flight Simulator*
  - *Euro Truck Simulator*

- **Management / Tycoon**
  - *RollerCoaster Tycoon*
  - *Cities: Skylines*
  - *Factorio*
- **Farming Simulation**
  - *Farming Simulator*
  - *Stardew Valley*

Sports & Racing

- **Sports**
  - *FIFA*
  - *NBA 2K*
  - *Madden NFL*
- **Racing**
  - *Gran Turismo*
  - *Need for Speed*
  - *Forza Horizon*
- **Extreme Sports**
  - *Tony Hawk's Pro Skater*
  - *Steep*

Fighting

- **Traditional 2D Fighter**
  - *Street Fighter*
  - *Mortal Kombat*
- **3D Fighter**
  - *Tekken*
  - *Soulcalibur*
- **Platform Fighter**
  - *Super Smash Bros.*
  - *Brawlhalla*

Horror

- **Survival Horror**
  - *Resident Evil*
  - *Silent Hill*
  - *The Forest*
- **Psychological Horror**
  - *Amnesia*
  - *Outlast*
  - *Layers of Fear*

Puzzle

- **Classic Puzzle**
  - *Tetris*
  - *Bejeweled*
- **Physics-Based Puzzle**
  - *Portal*
  - *The Incredible Machine*
- **Escape Room**
  - *The Room*
  - *Zero Escape*

Party & Casual

- **Party Games**
  - *Mario Party*
  - *Jackbox Party Pack*
- **Casual & Hypercasual**
  - *Candy Crush*
  - *Flappy Bird*

Sandbox & Open World

- **Sandbox**
  - *Minecraft*
  - *Garry's Mod*
- **Open World Adventure**
  - *The Legend of Zelda: Breath of the Wild*
  - *Grand Theft Auto*