

WHAT IS A GAME?

INTRODUCTION, TERMINOLOGY, HISTORY

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GAME MEDIA STUDIO



COURSE INTRODUCTION

WHAT, WHO, WHERE AND WHEN?

■ The Goal

1. Introduction into Game Development
2. Unity as an Example Platform
3. Game Development Processes

■ The People

- ▶ Guarantor : doc. Ing. Martin Čadík, Ph.D.
- ▶ Deputy Guarantor : MgA. Vojtěch Vaněk
- ▶ Instructors : doc. Ing. Martin Čadík, Ph.D.
Ing. Tomáš Polášek

■ The Institutions

- ▶ BUT FIT, Department of Computer Graphics, CPhoto@FIT
- ▶ BUT FFA, Game Media Studio

■ The Places and Times

- ▶ Lectures : Weekly, 13×, BUT FIT in Do207, 13:00-14:50



SYLLABUS OVERVIEW

■ Lectures

- 1 – 2 Introduction to Game Development
- 3 – 4 Inner Workings of a Game Engine
- 5 – 11 Game Systems in Unity
- 12 – 13 The Road from Idea to Game

■ Exercises

- 2 Analysis of Mechanics
- 3 Unity Project
- 5 Entity Control
- 7 Materials and Effects
- 9 Animation in 2D
- 10 Inventory Interface
- 12 Game Design Document

ASSESSMENT, POINTS, AND REQUIREMENTS

■ Evaluated Activities

- ▶ Practical exercises up to $7 \times 6 = 42$ points
- ▶ Game Jam project up to 58 points

■ Assignments

- ▶ Task specification released for the specified week
- ▶ Can be submitted until the end of the semester

■ Requirements

- ▶ At least 2 points from each exercise
- ▶ Mandatory Game Jam project, at least 24 points
- ▶ Minimum 50 points to pass the course

FUNDAMENTAL LITERATURE

JASON GREGORY. **GAME ENGINE ARCHITECTURE, SECOND EDITION.** 3rd. USA: A. K. Peters, Ltd., CRC Press, 2018. ISBN: 1351974288

JESSE SCHELL. **THE ART OF GAME DESIGN: A BOOK OF LENSES.** USA: A. K. Peters, Ltd., CRC Press, 2019. ISBN: 1138632097

R. NYSTROM. **GAME PROGRAMMING PATTERNS.** UK: Genever Benning, 2014. ISBN: 0990582906

UNITY TECHNOLOGIES. **UNITY USER MANUAL.**

<https://docs.unity3d.com/Manual/index.html>

PATRICIO GONZALEZ VIVO AND JEN LOWE. **THE BOOK OF SHADERS.**

<https://thebookofshaders.com>. 2015

STUDY LITERATURE

RAPH KOSTER. ***THEORY OF FUN FOR GAME DESIGN***. 2nd. USA: O'Reilly Media, Inc., 2013. ISBN: 1449363210

JESPER JUUL. ***THE ART OF FAILURE: AN ESSAY ON THE PAIN OF PLAYING VIDEO GAMES***. 2nd. UK: The MIT Press, 2016. ISBN: 0262529952

SIMON EGENFELDT, JONAS HEIDE SMITH, AND SUSANA PAJARES TOSCA. ***UNDERSTANDING VIDEO GAMES: THE ESSENTIAL INTRODUCTION***. 4th. USA: Routledge, 2019. ISBN: 1138363052

IAN MILLINGTON. ***GAME PHYSICS ENGINE DEVELOPMENT***. 2nd. USA: M. K. Publishers Inc., 2010. ISBN: 0123819768

IAN MILLINGTON AND JOHN FUNGE. ***ARTIFICIAL INTELLIGENCE FOR GAMES***. 2nd. USA: M. K. Publishers Inc., 2009. ISBN: 0123747317

DAVID H. EBERLY. ***3D GAME ENGINE DESIGN***. 3rd. USA: CRC Press, 2018. ISBN: 1138047853

DEFINITION OF A GAME

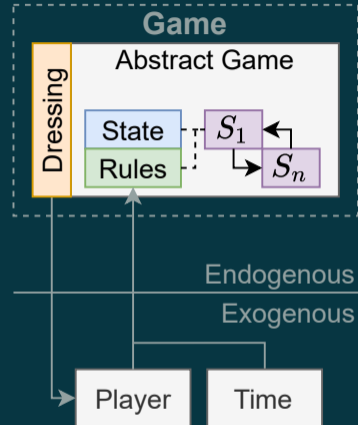
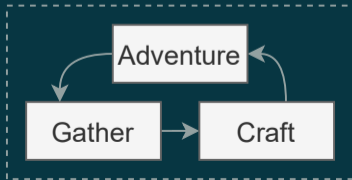
WHAT IS A GAME?

A game is 1) a rule-based formal system with 2) variable and quantifiable outcome, where 3) different outcomes are assigned different values, 4) the player exerts effort in order to influence the outcome, 5) the player feels attached to the outcome, and 6) the consequences of the activity are optional and negotiable.

Jesper Juul
The Game, the Player, the World
Half-Real [5]

WHAT REALLY IS A GAME?

- Game = Abstract Game + Dressing
- Play = Interaction with the Game
- Computer Game = Game using Digital Device
- Game Design -> Rules and Structures
- Game Development -> Complete Game
- Game Mechanics = Rules and Emergent Behavior
- Gameplay = Interactivity of Player ↔ Game
- Core Gameplay Loop = Flow of the Game



WHY DO WE LIKE GAMES?

Good games are **Fun**

Getting into the **Flow**

Other good **Reasons**

Practice, Meditation, Storytelling, Comfort

See Csikszentmihalyi [1], Juul [6], Koster [8]

WHY IS GAME DEVELOPMENT DIFFICULT?

- Games are **Complex**
- Games are **Interactive**
- Technology is **Mutable**
- Tools are **Evolving**¹
- Games are **Creative**
- Required **Testing**

- Making Games is **Hard**

It's a miracle that
any game is made.

Anonymous [13]

¹Graphics-Outside the Box by Mark Ferrari

HISTORY OF VIDEO GAMES

A BRIEF HISTORY OF (COMPUTER) GAMES

The Royal Game of Ur

Source: The British Museum



2600 - 2400 BCE

Senet

Source: Brooklyn Museum



1390 - 1353 BCE

Hnefatafl

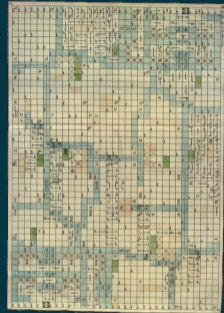
Source: Museum of Ireland



900 - 1100 CE

Ludwig Hellwig's Wargame

Source: Strategie Spielen



1780 CE



A BRIEF HISTORY OF (COMPUTER) GAMES

Spacewar! on PDP-1

Source: Computer History Museum



1962

Atari Pong Cabinet

Source: Neville Public Museum



1972

Atari 2600

Source: Vanamo Game Museum



1977

Space Invaders

Source: Arcade Museum



1978



A BRIEF HISTORY OF (COMPUTER) GAMES

Commodore 64

Source: Vanamo Game Museum



1982

Sega SG-1000

Source: Vanamo Game Museum



1983

Nintendo Famicom (NES)

Source: Vanamo Game Museum



1983



A BRIEF HISTORY OF (COMPUTER) GAMES

Nintendo Game Boy

Source: Vanamo Game Museum



1989

Introduction of 3D Graphics

Source: id Software



1991, 1992, 1993, 1996

Rise of PC Games

Source: Blizzard, MicroProse, Valve



1991, 1995, 1998



A BRIEF HISTORY OF (COMPUTER) GAMES

Sega Saturn

Source: Vanamo Game Museum, MobyGames



1994

Sony PlayStation

Source: Vanamo Game Museum, MobyGames



1994

Nintendo 64

Source: Vanamo Game Museum, MobyGames



1996



A BRIEF HISTORY OF (COMPUTER) GAMES

Video Game Modding

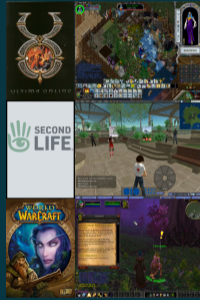
Source: Online



1990s

Online Multiplayer Games

Source: EA, Linden Lab, Blizzard



1997, 2003, 2004

6th Generation Consoles

Source: Vanamo Game Museum



2000, 2001, 2001



A BRIEF HISTORY OF (COMPUTER) GAMES

Rise of the Indies

Source: Microsoft, Team Meat, Mojang



2008, 2010, 2011

The Console Wars

Source: Vanamo Game Museum



2005/2013, 2006/2013, 2012/2017

DLC, MTC, Loot Boxes

Source: Bethesda, EA, Valve



2006, 2008, 2010



A BRIEF HISTORY OF (COMPUTER) GAMES

Virtual Reality

Source: Nintendo, HTC, Oculus, Sony



1996, 2015, 2016

AR & VR Games

Source: Nintendo, Beat Games, Valve



2016, 2016, 2020

Focus on Visual Realism

Source: AMD, NVidia, CD Projekt



2010s and 2020s



A BRIEF HISTORY OF (COMPUTER) GAMES



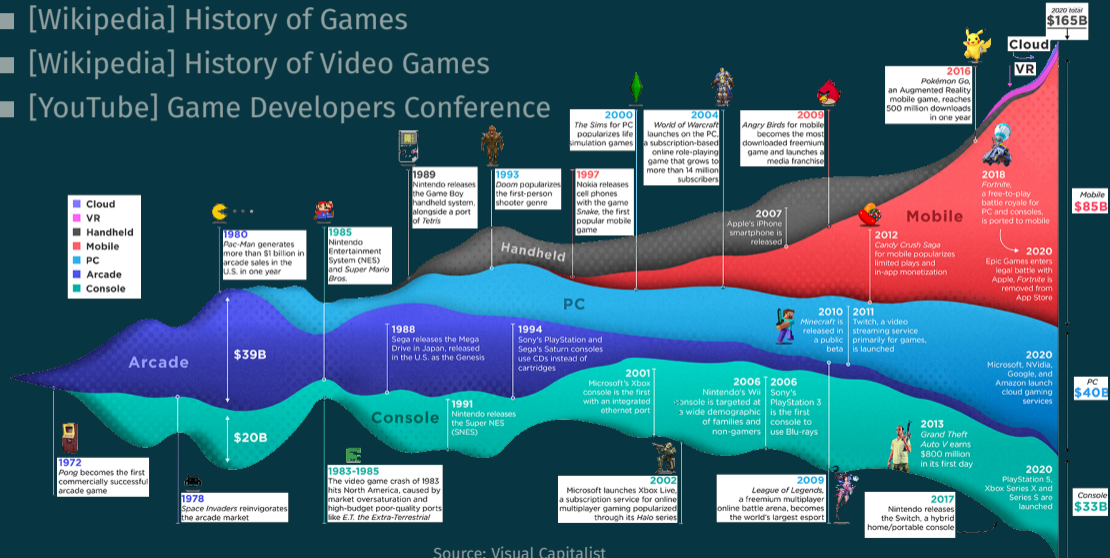
Market Growth
AAA × Indie Schism
Focus on Fidelity

Up to you!



ADDITIONAL RESOURCES

- [Wikipedia] History of Games
- [Wikipedia] History of Video Games
- [YouTube] Game Developers Conference



Source: Visual Capitalist



Thanks For
Your Attention!

Kings Quest V

REFERENCES I

- [1] MIHALY CSIKSZENTMIHALYI. **FLOW: THE PSYCHOLOGY OF OPTIMAL EXPERIENCE**. Vol. 1990. Harper & Row New York, 1990. ISBN: 0060920432.
- [5] JESPER JUUL. **HALF-REAL: VIDEO GAMES BETWEEN REAL RULES AND FICTIONAL WORLDS**. UK: The MIT Press, 2005. ISBN: 0262101106.
- [6] JESPER JUUL. **HALFREAL: A DICTIONARY OF VIDEO GAME THEORY**. <https://www.half-real.net/dictionary/>. 2005.
- [8] RAPH KOSTER. **THEORY OF FUN FOR GAME DESIGN**. 2nd. USA: O'Reilly Media, Inc., 2013. ISBN: 1449363210.
- [13] JASON SCHREIER. **BLOOD, SWEAT, AND PIXELS : THE TRIUMPHANT, TURBULENT STORIES BEHIND HOW VIDEO GAMES ARE MADE**. English. 2017.