VIDEO GAME DESIGN WORKSHOP

2022 SUMMER - GIUSEPPE TURINI

Kettering
UNIVERSITY

WORKSHOP STRUCTURE

Part 1 (2 hrs): **Introduction to Video Game Design, and In-Class Level Design**

Video Game Design, GDD, Level Design, Introduction to "Tanks!"

In-Class Level Design for "Tanks!"

Part 2 (3 hrs): **Introduction to System Design, and In-Class System/UI Design**

Game Mechanics, Game Engine, Physics and Collision Detection, Scripting

UIs, HUDs, Controls, Feedback, Introduction to Game Development in Unity

In-Class System/UI Design for "Tanks!"

Part 3 (2 hrs): **In-Class Designs Review/Testing, and Game Design History**

In-Class Review/Testing of Level/System/UI Designs

Game Design History

EXTERNAL RESOURCES

Workshop Material:

- Instructor personal website: sites.google.com/view/turinig
- These slides (as PDF file): github.com/turinig/vgdw
- Video game executables (as Windows build): github.com/turinig/vgdw
- Video game project (as Unity project): assetstore.unity.com/tanks-tutorial

External References

- Complete list of references in appendices.

TABLE OF CONTENTS

INTRODUCTION

"Experience is the hardest kind of teacher. It gives you the test first and the lesson afterwards."

OSCAR WILDE.

VIDEO GAME ELEMENTS

Gameplay: The interactive aspects of video game design, including: the player interactions with the game for entertainment/education/training purposes.

Game Mechanics: The game rules dictating how the player acts in the game.

Example: A game mechanic of *"having missions and mission-objectives"* forces the player to adhere to those rules, the associated gameplay consists in *"completing and engaging with those missions and objectives."*

Narrative: The creation of a context for all events happening in a video game.
This makes playing less abstract, and improves immersion.

ESRB RATING

ESRB: The Entertainment Software Rating Board (ESRB) is a panel determining the rating a game receives depending on: gameplay, character actions, blood, profanity, and several other game elements. The final rating could be::

- **EC:** early childhood.
- **E:** for everyone.
- **E10+:** for everyone at least 10 years old.
- **T:** for teenagers.
- **M:** for mature audience.
- **AO:** for adults only.
- **RP:** for *"rating pending"* (a game not rated yet).

VIDEO GAME TYPES

Action: Video games emphasizing hand-eye coordination and motor skills.

Adventure: Video games in which gameplay does not involve reflex challenges or actions, usually including puzzles to be solved in a non-confrontational way.

Action-Adventure: Video games combine action and adventure elements, typically featuring long-term obstacles, item gathering, exploration, and combat.

Puzzle: Video games in which the focus is on solving riddles (abstract, mathematical, mysteries, horror, etc.).

Simulation: Video games in which the focus is on simulating realistic actions (airplane piloting, car racing, etc.).

VIDEO GAME TYPES (2)

Role-Playing: Also called RPG, these are video games in which the player plays a certain character in the game world.

Strategy: Video games focusing on gameplay requiring careful and skillful thinking and planning in order to win.

Sports: Video games simulating sports (realistically or arcade-style. The opponent can be controlled by other players or artificial intelligence (AI).

MMO: Acronym for "massively multiplayer online", these video games are focused on multiplayer gameplay designed to support thousands of online players simultaneously.

VIDEO GAME GENRES

FPS/TPS (Action): First-person shooters (FPS) or third-person shooters (TPS) in which the player plays a character with gameplay focused on firearm combat.

Platformer (Action): Video games in which the player has to jump from platform to platform, avoiding obstacles/traps.

Party: Video games in which the focus is on multi-player mode: each player facing each other, designed to be played at parties.

Fighting (Action): Video games focused on close-range combat, usually featuring multiple playable characters and a competitive multiplayer mode.
"Beat 'em up" is a sub-genre with combat against waves of enemies.
"Hack and slash" is a sub-genre with non-firearm combat.

VIDEO GAME DESIGN

"The focus of a game designer is designing game play, conceiving and designing rules and structures that result in an experience for players. Thus, game design, as a discipline, requires a focus on games in and of themselves."

KATIE SALEN & ERIC ZIMMERMANN. *"RULES OF PLAY."* 2004.

VIDEO GAME DESIGN AND DESIGNERS

Video Game Design: The design of the content and rules of a video game, including: gameplay, environment, storyline, and characters.
Some subdisciplines are (in no particular order):

- World design, content design, game writing, audio design, etc.
- System (game mechanic) design.
- Level design.
- User interface (UI) design.

Video Game Designer: The video game designer is the visionary of the game and leads the artistic and technical development of the game (as an individual or as part of a design team).
In the past, programmers included designers. Nowadays, for complex video games, designers are separated from programmers.

WORLD DESIGN, AND GAME WRITING

World Design: The creation of a backstory, setting and theme for the video game, including: inventing a universe and/or a map.

Game Writing: The creation of all dialogues, texts and stories included in a video game. It is one of the initial stages in designing a video game, and it also includes: voice acting, picture editing, and music.

CONTENT DESIGN, AND AUDIO DESIGN

Content Design: The creation of all characters, items, puzzles, missions, and any other aspect of the video game that is not strictly necessary for the game play. In other words, the generation of the added complexity to a minimum viable video game prototype.

Audio Design: The creation/integration of all of the sounds in a video game, including:

- Background music (title screens, menus, in-game, etc.).
- Sound effects (environment, actions, UI, etc.).
- Voice acting (non-player characters, cutscenes, etc.).

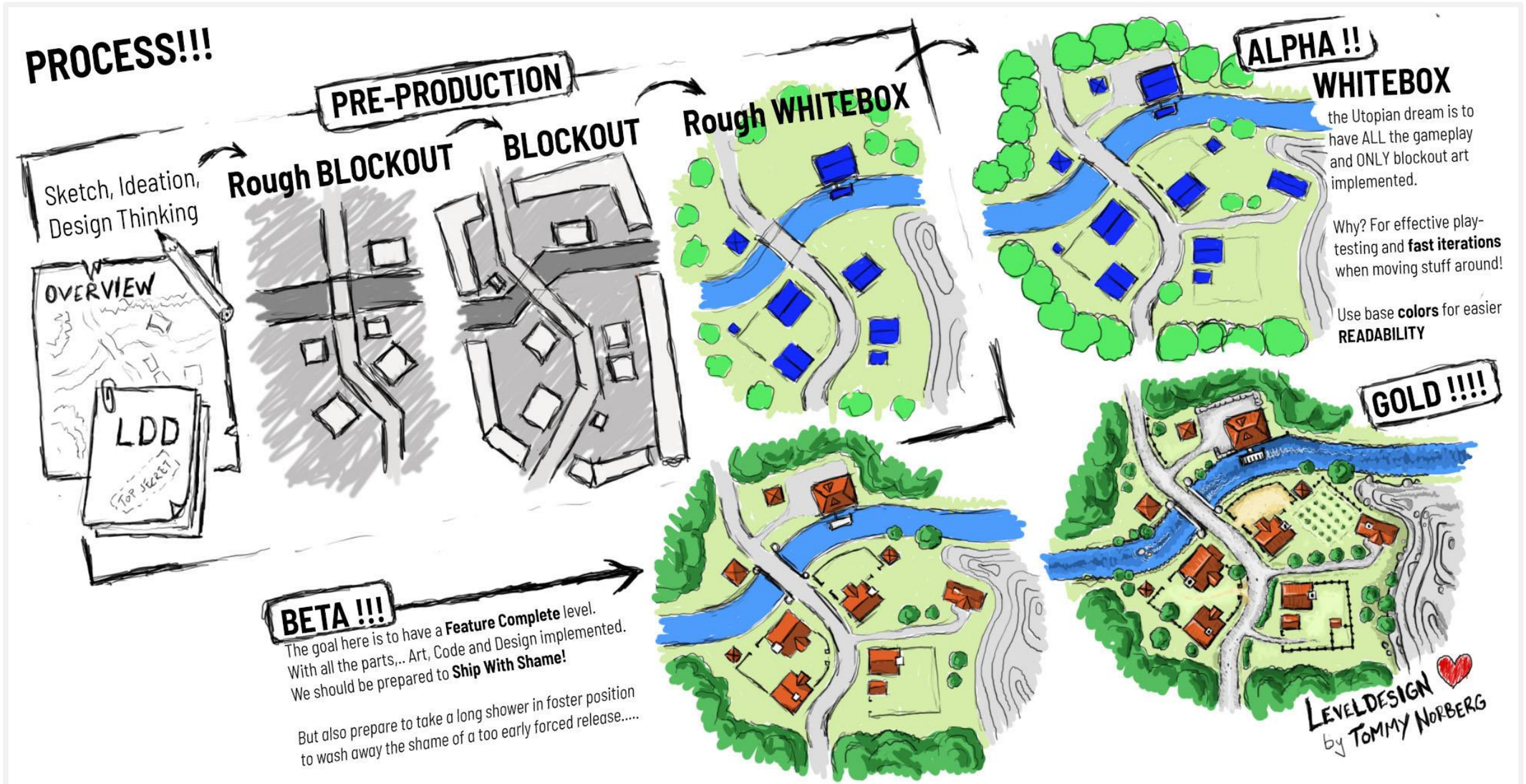
LEVEL DESIGN

The creation of video game levels and their features.

Level design includes multiple different technical fields: illumination, space, framing, color/contrast, etc. All these techniques/elements can be used:

- To draw the player attention.
- To guide/mislead the player.
- To improve immersion, etc.

LEVEL DESIGN: EXAMPLE



SYSTEM DESIGN

Also called Game Mechanics Design, it is the creation of all the game rules and mathematical patterns necessary to simulate a game designed to interact with the player.

It is considered the main contributor to the *"experience"* a player has with a video game.

Example: A complex game mechanics system leads to a more unpredictable gameplay, and results in a more immersive experience for the player.

SYSTEM DESIGN: EXAMPLE

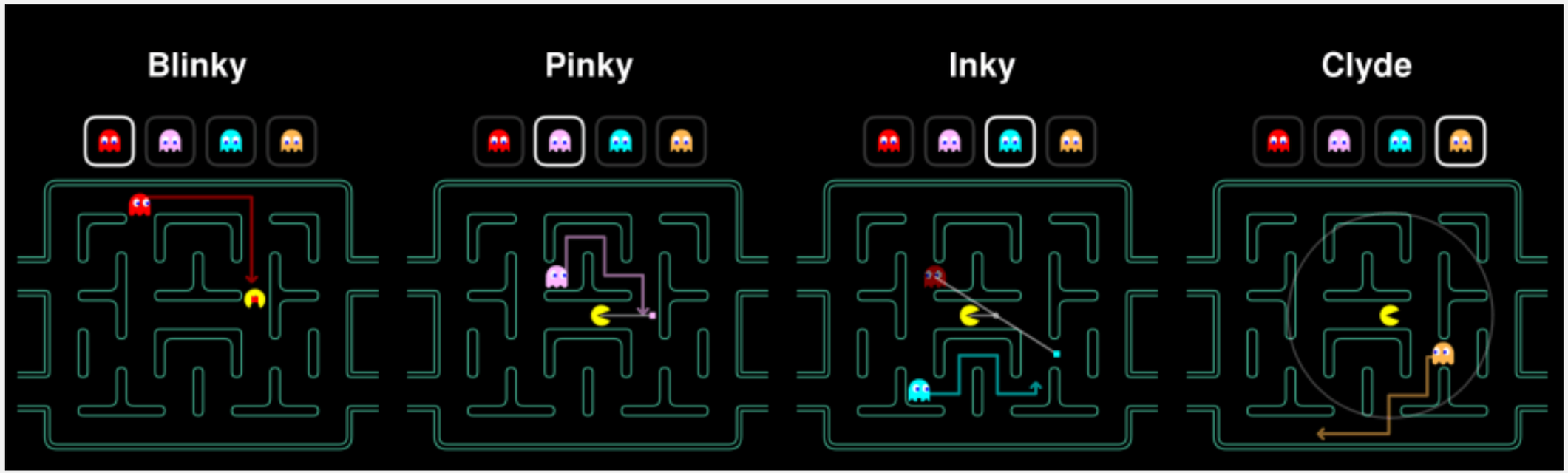


Figure: The patters used by the different *"ghosts"* (enemies) in the video game *"Pac-Man"* when *"chase mode"* is activated.

USER INTERFACE DESIGN

The creation of the user interactions and feedback interface, including:

- **Menus:** settings, in-game, etc.
- **Heads-up displays (HUDs):** life bars, ammo counters, mini-maps, timers, etc.
- **Controls:** mouse-keyboard, point-and-click, joypad, etc.
- **Visual feedback:** damages, power ups, etc.

UI design is also interconnected with system (game mechanics) design.

UI design decides the amount of information provided to the player: finding a good tradeoff between making the video game intuitive/user-friendly but also engaging/challenging.

USER INTERFACE DESIGN: EXAMPLE

Figure: The non-diegetic UI elements in the video game *"Star Wars"*.

GAME DESIGN DOCUMENT

A game design document (GDD) is a *"living"* software design document of a video game.

A GDD is edited by the design/development team and it is used in the video game industry to organize the design/development process.

When a video game is commissioned by a publisher, the GDD is created and it is attached to the agreement between publisher and developer.

Example: See GDDs of some commercial video games (Doom, GTA, Silent Hill 2).

IN-CLASS ACTIVITY: LEVEL DESIGN

- Consider the video game project *"Tanks!"*, and
- design a new level with your classmates.

- This level will be implemented by the instructor before the next session, and
- then it will be played/reviewed/tested in class.

LEVEL DESIGN: EXAMPLE STUDENT WORK

LEVEL DESIGN: IN-CLASS WORK

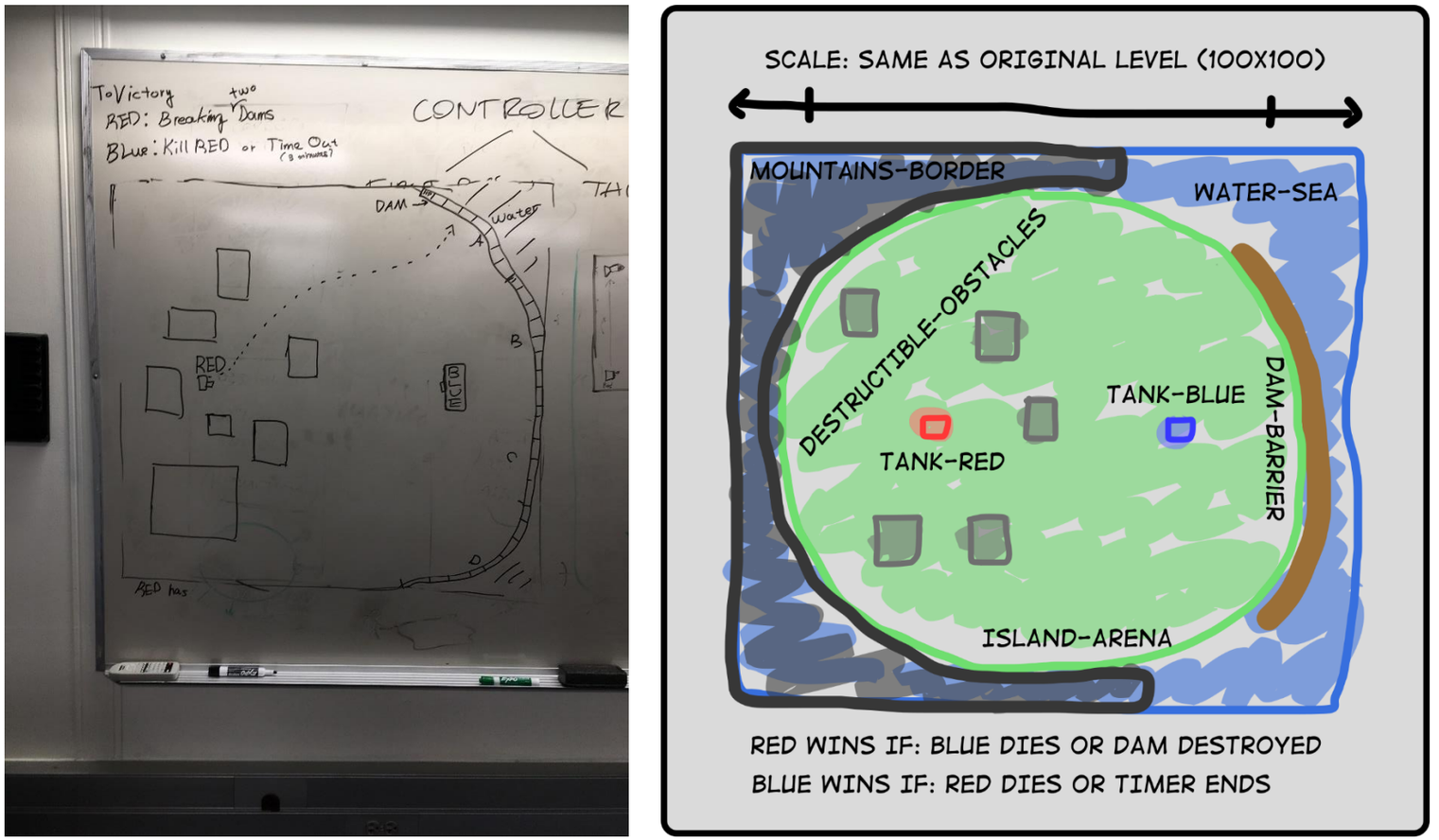


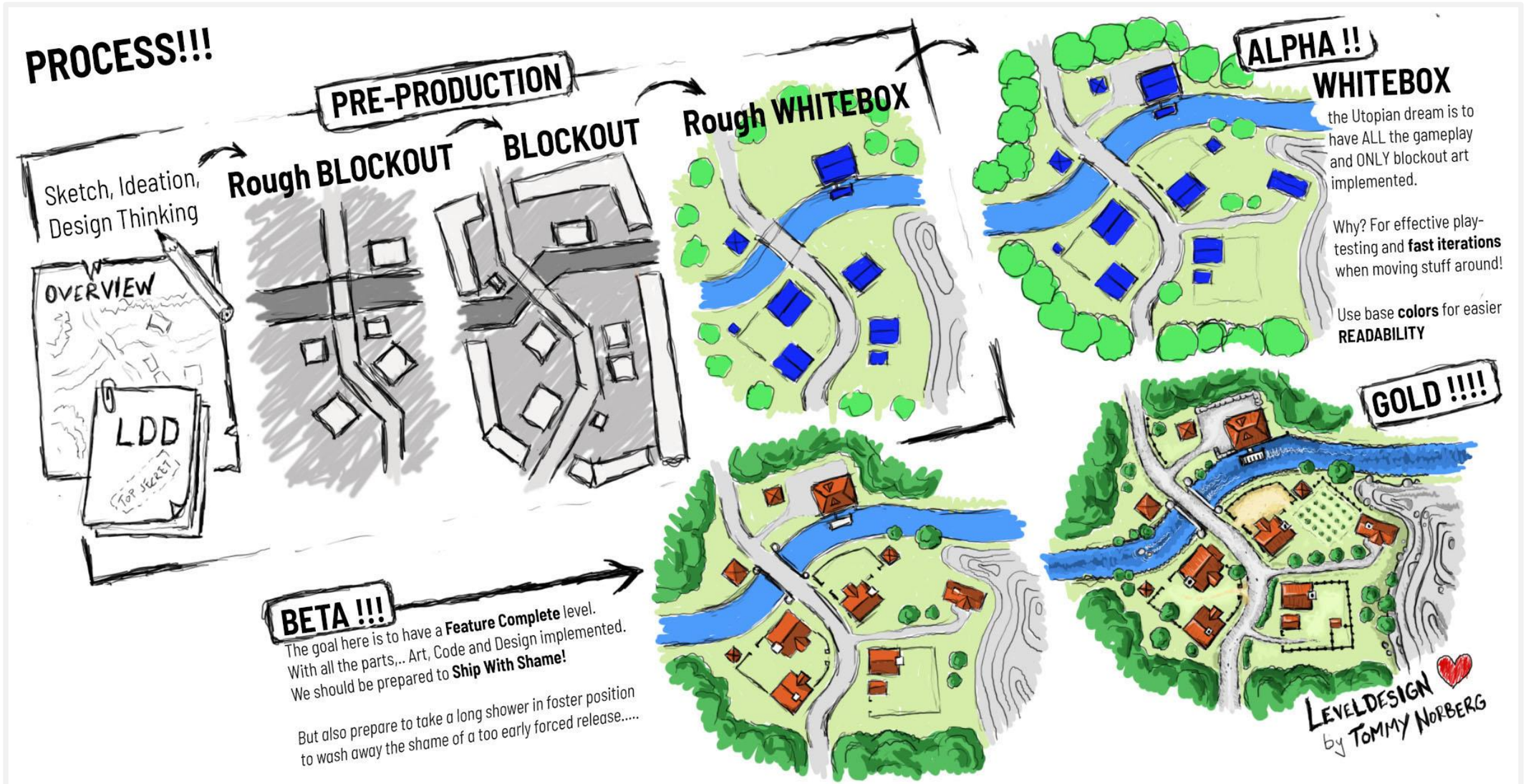
Figure: Draft of level design created by the students (left), then polished (right) and implemented by the instructor, to be reviewed/tested by the students.

LEVEL DESIGN

https://en.wikipedia.org/wiki/Level_(video_games)

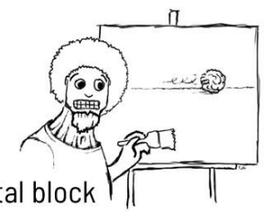
WORK-IN-PROGRESS

LEVEL DESIGN: PROCESS



LEVEL DESIGN: STEP 1

Step 1: Ideation



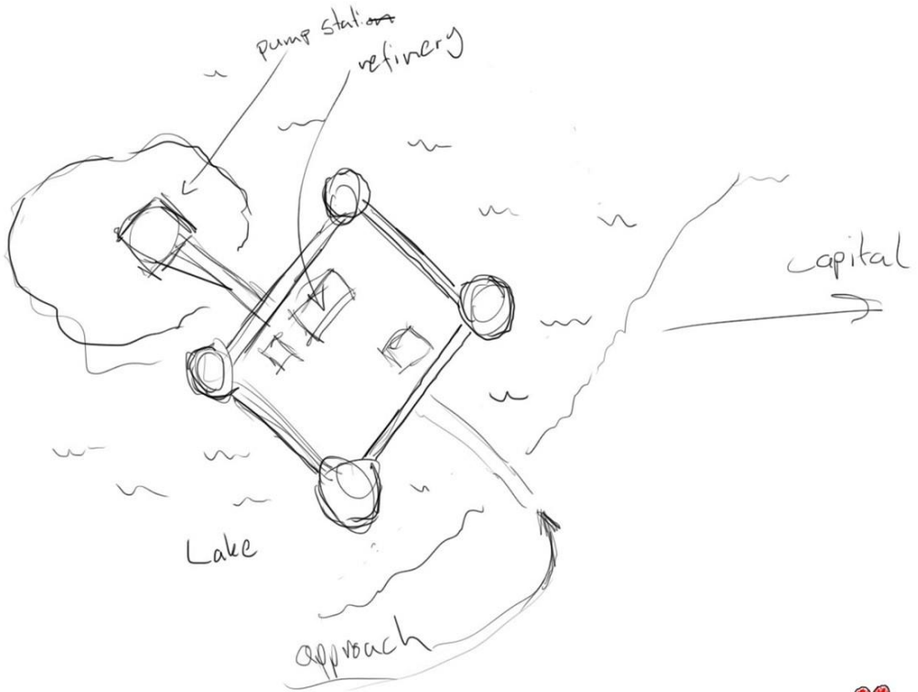
DOODLES!

It doesn't matter if it's ugly.
This stage is to break the mental block and the **Blank Canvas Stress**.

Start brainstorming in your own brain first!
Then pitch it to someone close to the project.

This is a time with fast iterations, brave ideas and testing crazy shit...

Most of them in lightning speed in your brain.



You cannot toss and turn every single idea in a meeting, that would take too long.
With experience you will become your own producer and realize when an idea is too costly or complicated for your team or project.

LEVELDESIGN by TOMMY NORBERG

LEVEL DESIGN: STEP 2

Step 2: Reference gathering

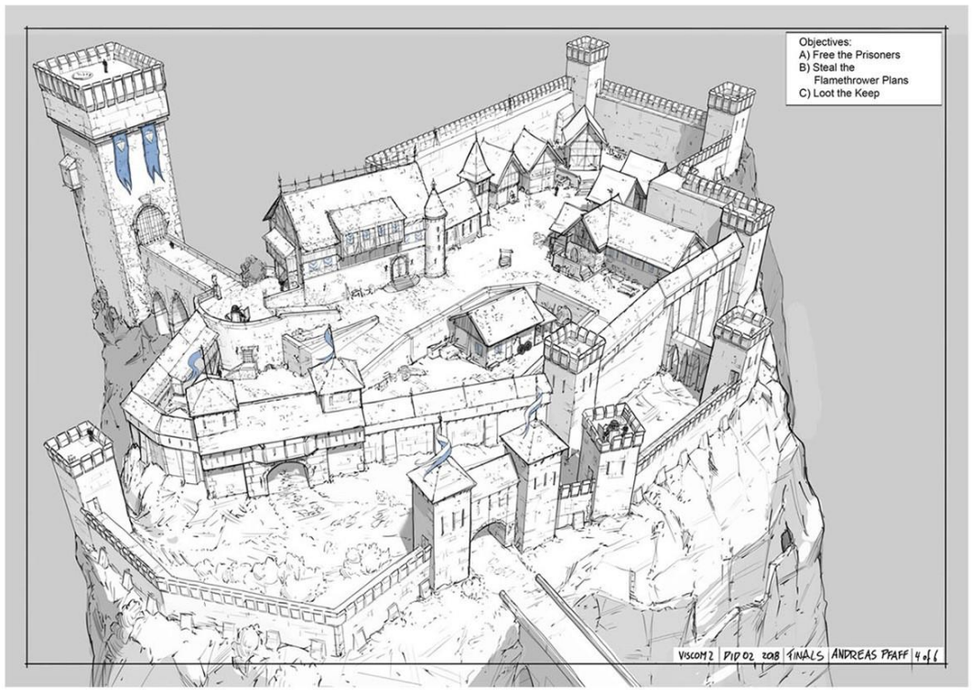
This step is often fused with step 1.
But you have to have some kind of idea of what to search for.. ☺

This is sometimes called a "Program" by architects...

Collecting a full library of images, videos and sounds to use as inspiration and references for the project.

*I collected a lot of images but found this lovely image by **Andreas Pfaff** to be very close to where I initially was heading.*

I used it as my first steppingstone.



LevelDesign ♥ by Tommy Nordberg

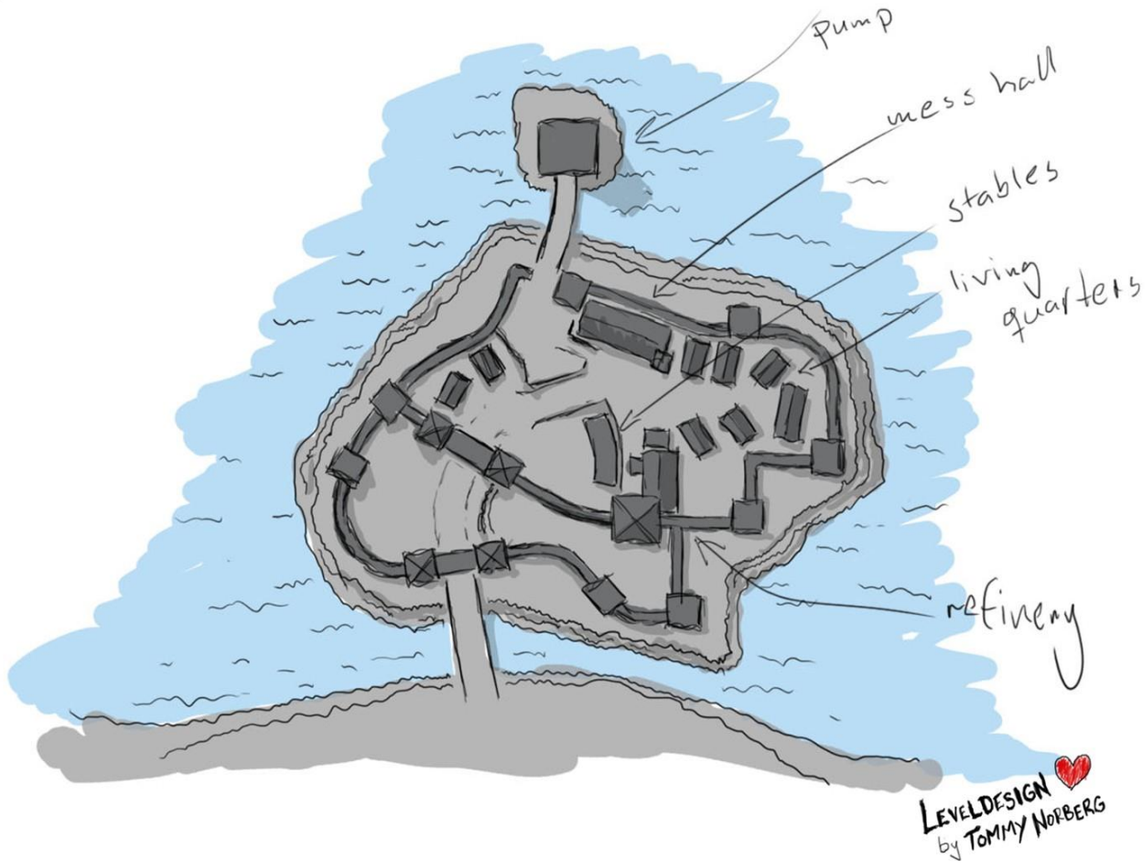
LEVEL DESIGN: STEP 3

Step 3: Rough Overview

First I do a very rough overview.
This one started out as an exact copy of Andreas Pfaffs image from step 2.

Then I jump into the game-engine and block it out! I call this first version my '**Rough blockout**'.

I'm fast to enter the game engine because a want to get a
'Sence of Space'
and a
'Sence of Scale'
Before I continue with more nitty-gritty details.



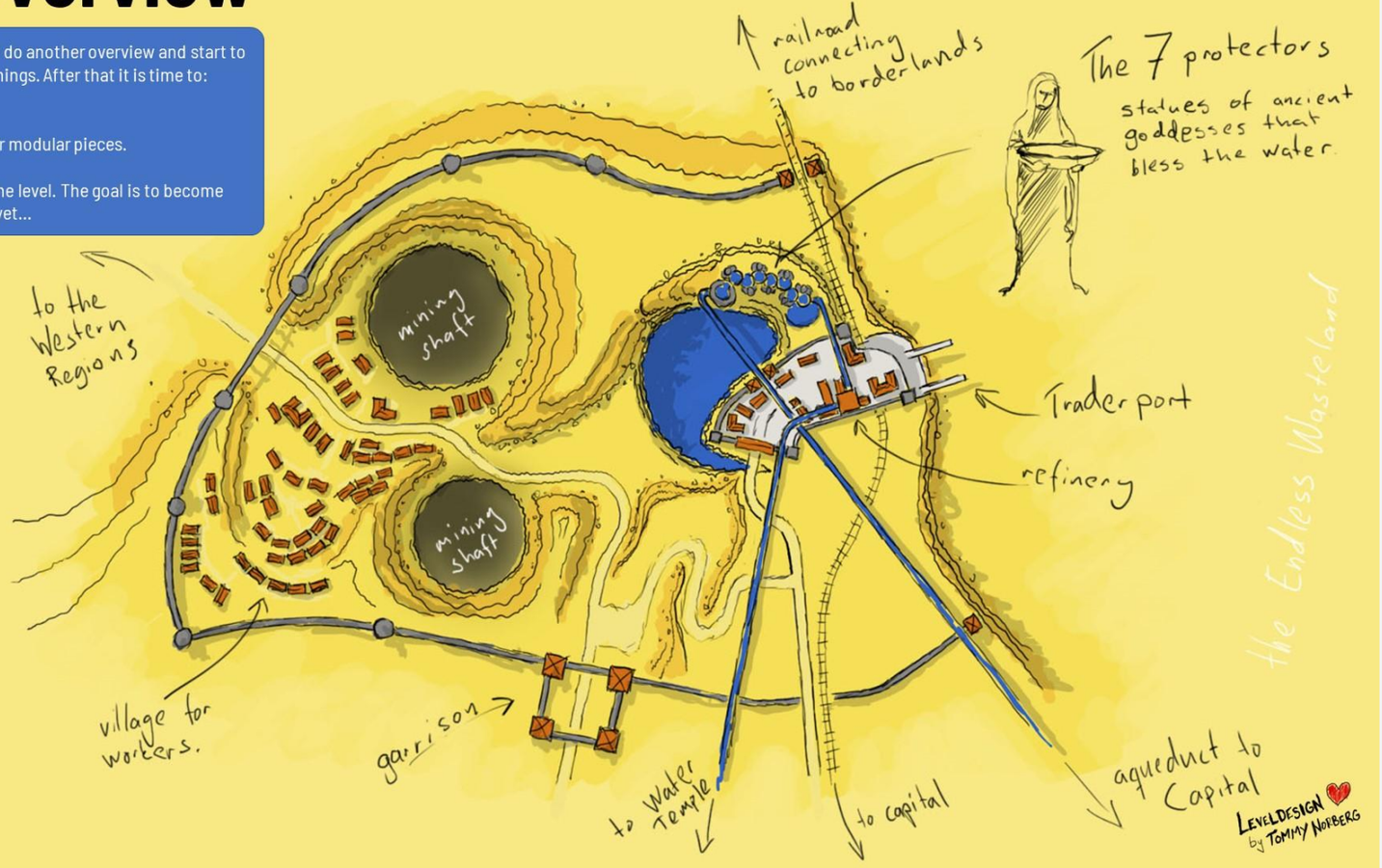
LEVEL DESIGN: STEP 4

Step 4: Overview

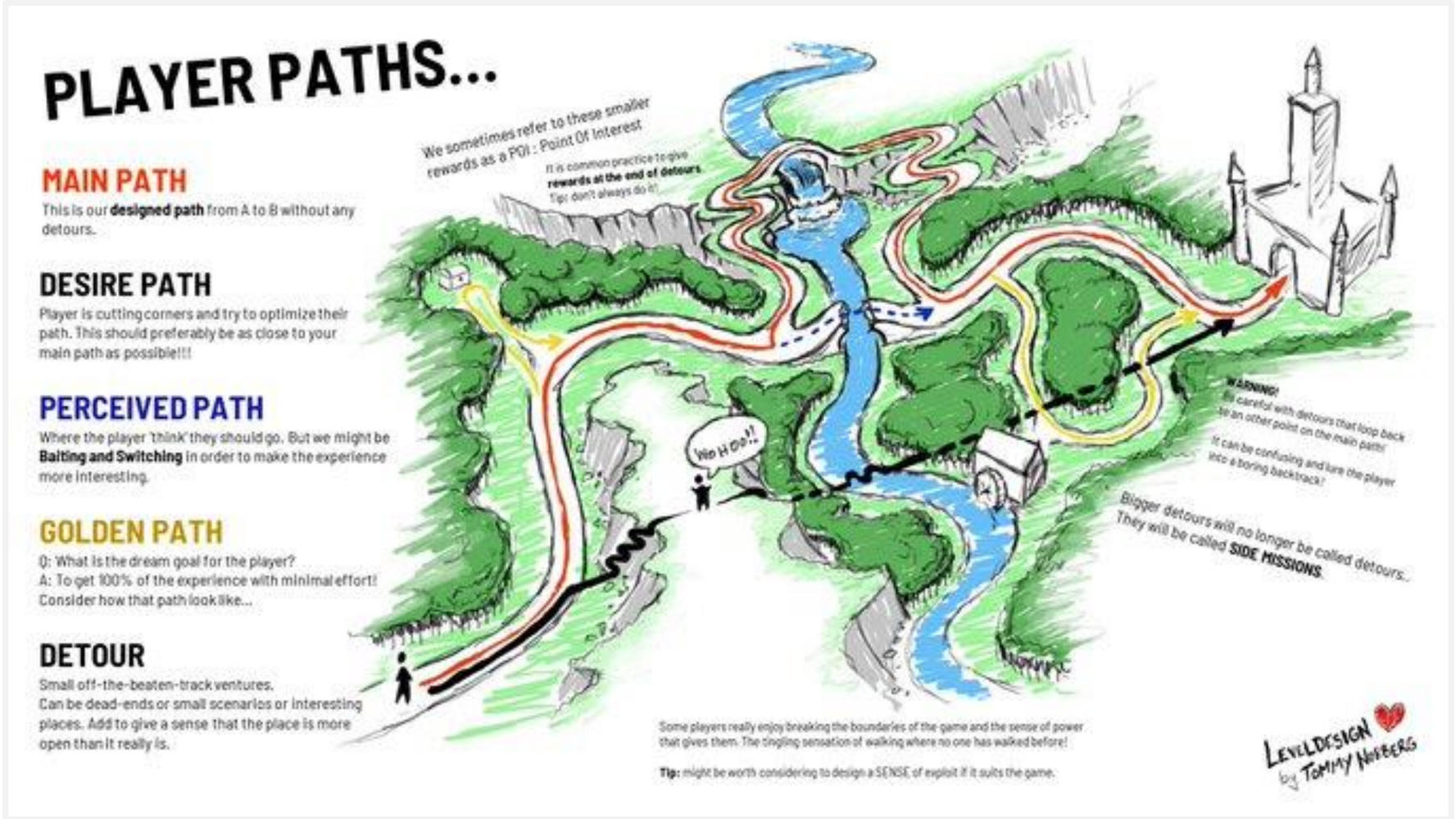
When I'm done with my **BLOCKOUT** I do another overview and start to analyze if I need to add or remove things. After that it is time to:

- Add gameplay
- Start replacing geo with proper modular pieces.

I call that the **WHITEBOX** phase of the level. The goal is to become FEATURE COMPLETE. I'm not there yet...

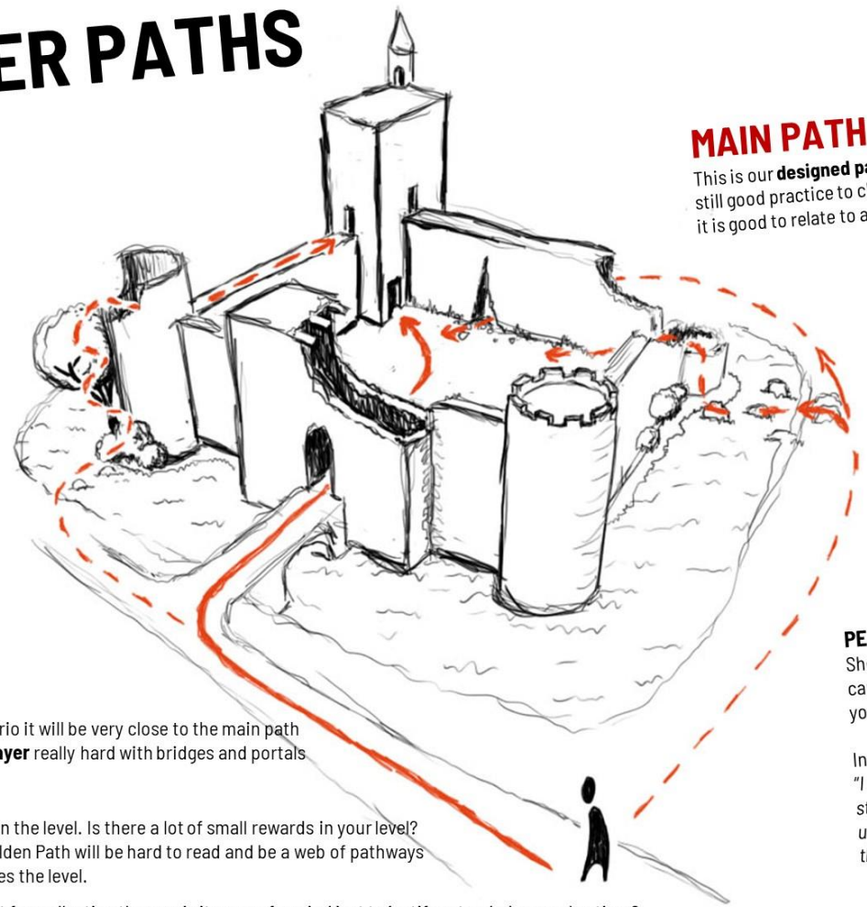


LEVEL DESIGN: PLAYER PATHS 1



LEVEL DESIGN: PLAYER PATHS 2

PLAYER PATHS
PART 2



DESIRE PATH
In this particular scenario it will be very close to the main path since we **funnel the player** really hard with bridges and portals

GOLDEN PATH
Getting a 'Gold medal' on the level. Is there a lot of small rewards in your level? A lot of the time the Golden Path will be hard to read and be a web of pathways when the player explores the level.

Consider this: Is it fun collecting them or is it more of a grind just to justify extended gameplay time?

MAIN PATH
This is our **designed path** from A to B without any detours. If it is an open world it is still good practice to choose ONE path to articulate. Even if the player doesn't walk it, it is good to relate to and to build mental maps. It becomes a **leading line.**

SECONDARY PATHS
In most cases we want multiple approaches. It is good for world building and to creating meaningful loops in the environment.

But mostly because it gives **PLAYER AGENCY!**
"no.. I don't want to go on that obvious main path.. I want to go here instead."

These paths aren't at first glance noticeable, but they should have their own composition and flow once the player starts to walk them!

PERCEIVED PATH
Should in most cases be the same as the main path (But we as developers can play with this from time to time). This is as the **PLAYER** perceives your game world and has to do a lot with composition and guidance.

In development it can go something like this:
*"I have blocked the **perceived path** with a metal gate. The player will have to stop and come up with another plan! The **main path** is the ventilation drum up to the left. But they could also opt to take the **secondary path** through the sewer system."*

LEVELDESIGN by TOMMY NORBERG

SYSTEM/UI DESIGN

System Design, also called Game Mechanics Design, is the creation of all the game rules and mathematical patterns necessary to simulate a game designed to interact with the player.

It is considered the main contributor to the *"experience"* a player has with a video game.

The interaction of various game mechanics in a game determines the complexity and level of player interaction in the game, and in conjunction with the game environment and resources determine game balance.

GAMEPLAY VS GAME MECHANICS

Gameplay: The interactive aspects of video game design, including: the player interactions with the game for entertainment/education/training purposes.

In video games, players consider gameplay as including: (1) what the player can do, and (2) what other game elements can do (in response to the player actions).

Game Mechanics: The game rules dictating how the player acts in the game.

From a programming/development perspective, gameplay can be deconstructed to reveal the underlying game mechanics.

For example: the gameplay of a fighting video game can be deconstructed to attack and defense (game mechanics), etc.

So, game mechanics are a technical/engineering concept, whereas gameplay is a design concept.

MAIN GAME MECHANICS: TURNS

A game turn is an important fundamental concept to almost all non-computer games, and many video games as well (although in video games, various real-time genres have become much more popular). In general, a turn is a segment of the game set aside for certain actions to happen before moving on to the next turn, where the sequence of events can largely repeat. In a truly abstract game (backgammon) turns are nothing more than a means to regulate play. In less abstract games (Risk), turns obviously denote the passage of time, but the amount of time is not clear, nor important. In simulation games, time is generally more concrete. Wargames usually specify the amount of time each turn represents, and in sports games a turn is usually distinctly one 'play', although the amount of time a play or turn takes can vary.

Some games use player turns where one player gets to perform their actions before another player can perform any on their turn (Monopoly and chess would be classic examples). Some use game turns, where all players contribute to the actions of a single turn (board-game simulations of American football tend to have both players pick plays and then determine the outcome; each 'play' or 'down' can be considered a turn). Some

games have 'game turns' that consist of a round of player turns, possibly with other actions added in (Civilization plays with a series of player turns followed by a trading round in which all players participate).

In games that are meant to be some sort of simulation, the on/off nature of player turns can cause problems and has led to a few extra variations on the theme. The semi-simultaneous turn allows for some reactions to be done during the other player's turn. The impulse-based turn divides the turn into smaller segments or impulses where everyone does some of their actions at one time, and then reacts to the current situation before moving on to the next impulse (as seen in Star Fleet Battles or Car Wars).

In some games, not all turns are alike. Usually, this is a difference in what phases (or different portions of the turn) happen. Imperium Romanum II for instance, features a "Taxation and Mobilization Phase" in every third turn (month), which does not occur in the other turns. Napoleon has an unusual variation on the idea, where every third player turn is 'night turn' where combat is not allowed.

Even in real-time computer games, there are often certain periodic effects. For instance, a

wounded character in World of Warcraft will gradually recover health while out of combat. The rate of recovery is calculated from the character's statistics and applied per "tick" as a lump sum, so a character would gain ten health per tick, instead of one every tenth of a tick. These periodic effects can be considered the vestigial remnants of the concept of turns.

WORK-IN-PROGRESS

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IN-CLASS ACTIVITY: SYSTEM DESIGN

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WORK-IN-PROGRESS

HISTORY OF VIDEO GAME DESIGN

This is a list of video games that are considered (in the gaming community) to be among the best (significant) of all time.

Note: Please consider that text-based video games have been excluded from this list, because they are less relevant to modern video game design.

VIDEO GAME HISTORY: PONG (1972)

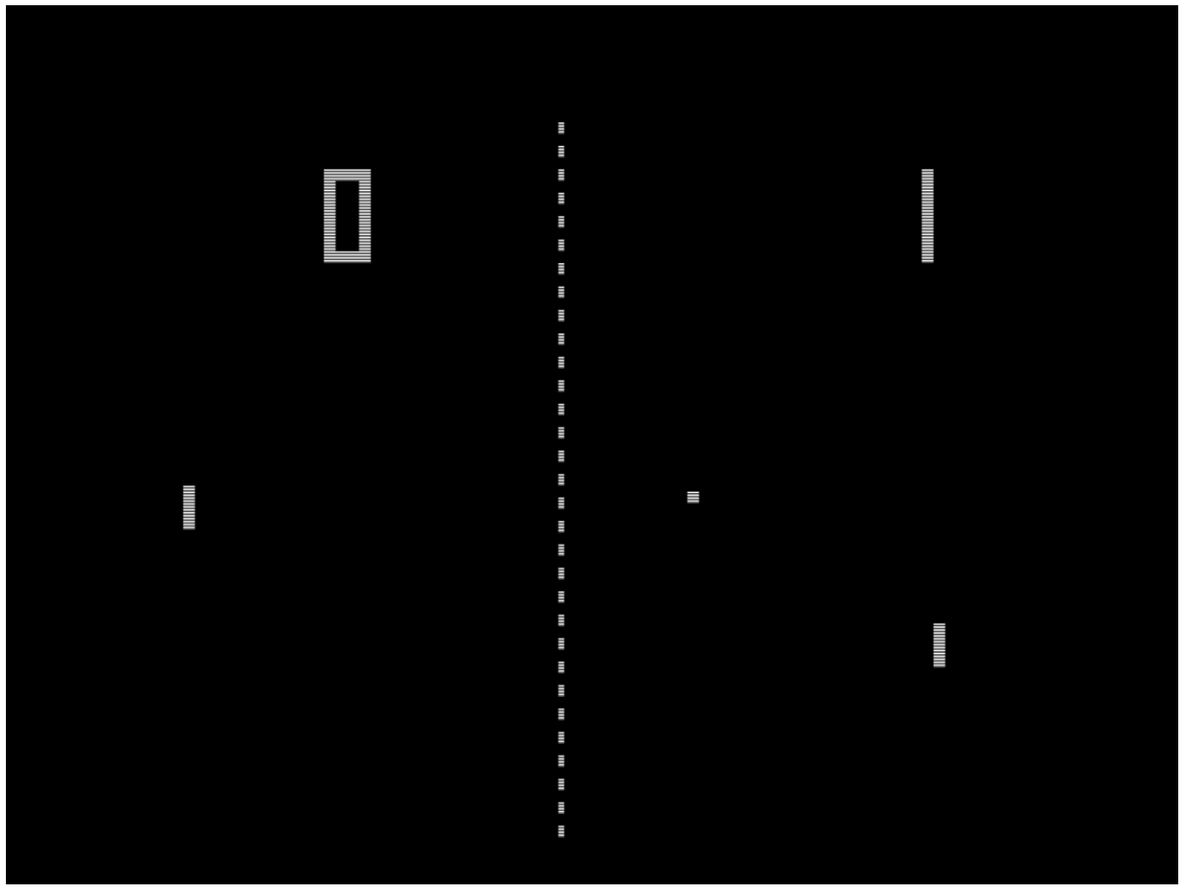

Figure: Cabinet of the sport video game *"Pong"* by Atari (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: SPACE INVADERS (1978)

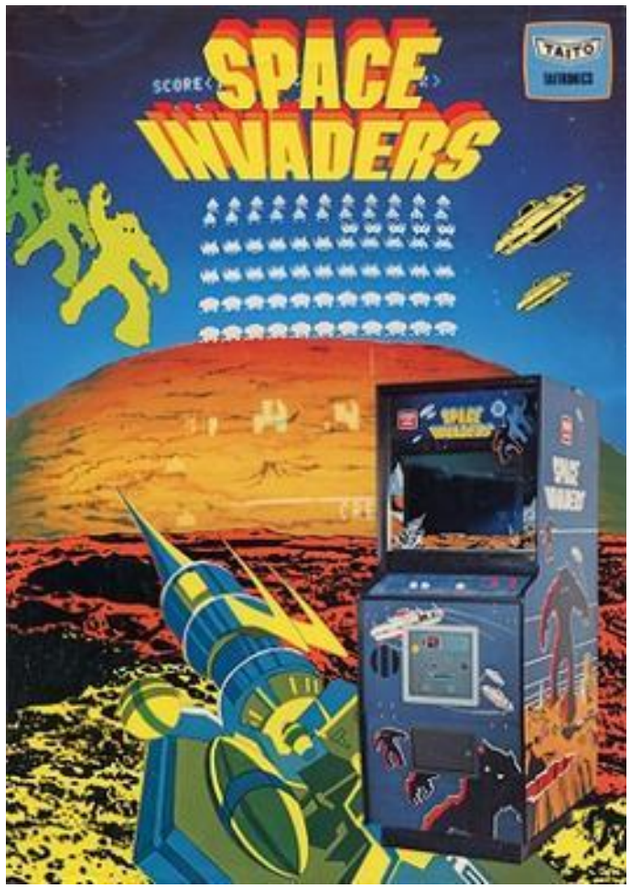

Figure: Flyer of the *"shoot 'em up"* video game *"Space Invaders"* by Taito (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: ASTEROIDS (1979)

Figure: Flyer of the *"shoot 'em up"* video game *"Asteroids"* by Atari (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: ADVENTURE (1980)

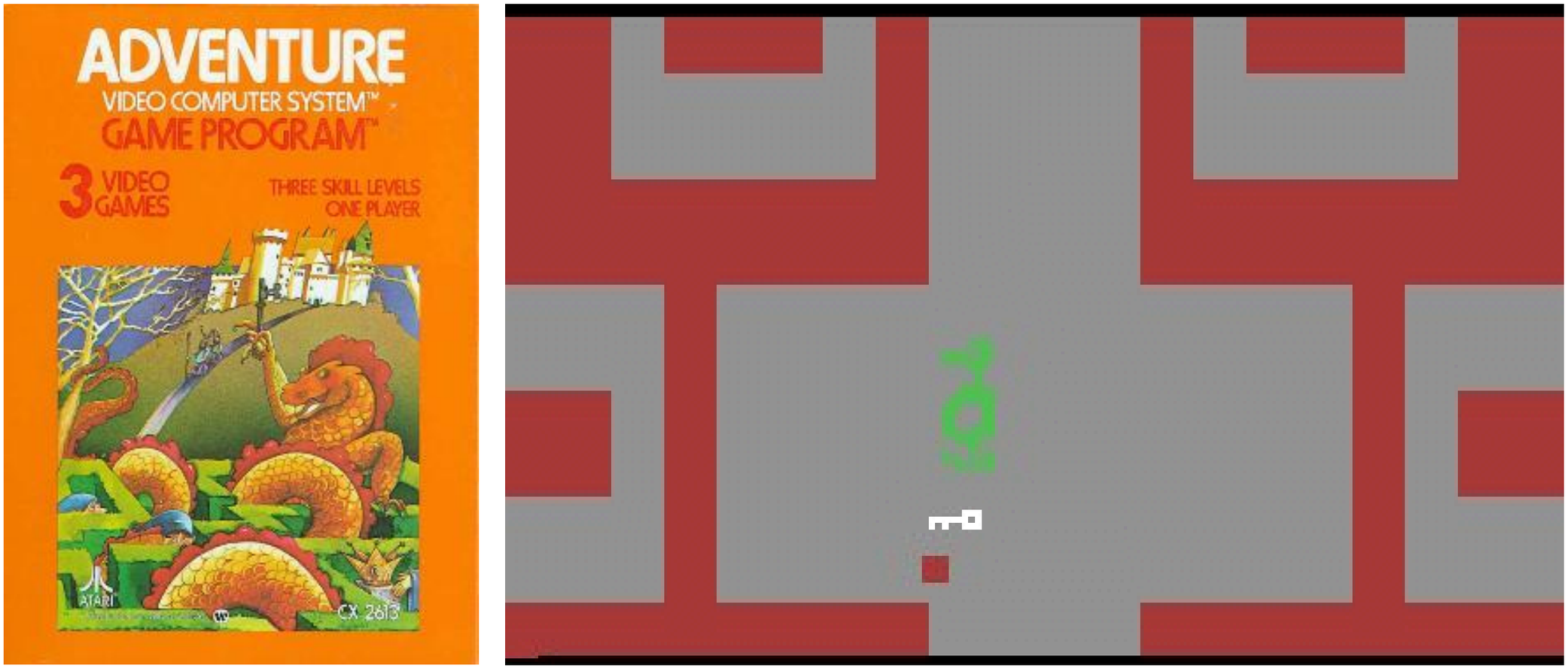

Figure: Cover of the action-adventure video game *"Adventure"* by Atari (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: PAC-MAN (1980)

Figure: Flyer of the maze video game *"Pac-Man"* by Atari (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: TETRIS (1984)

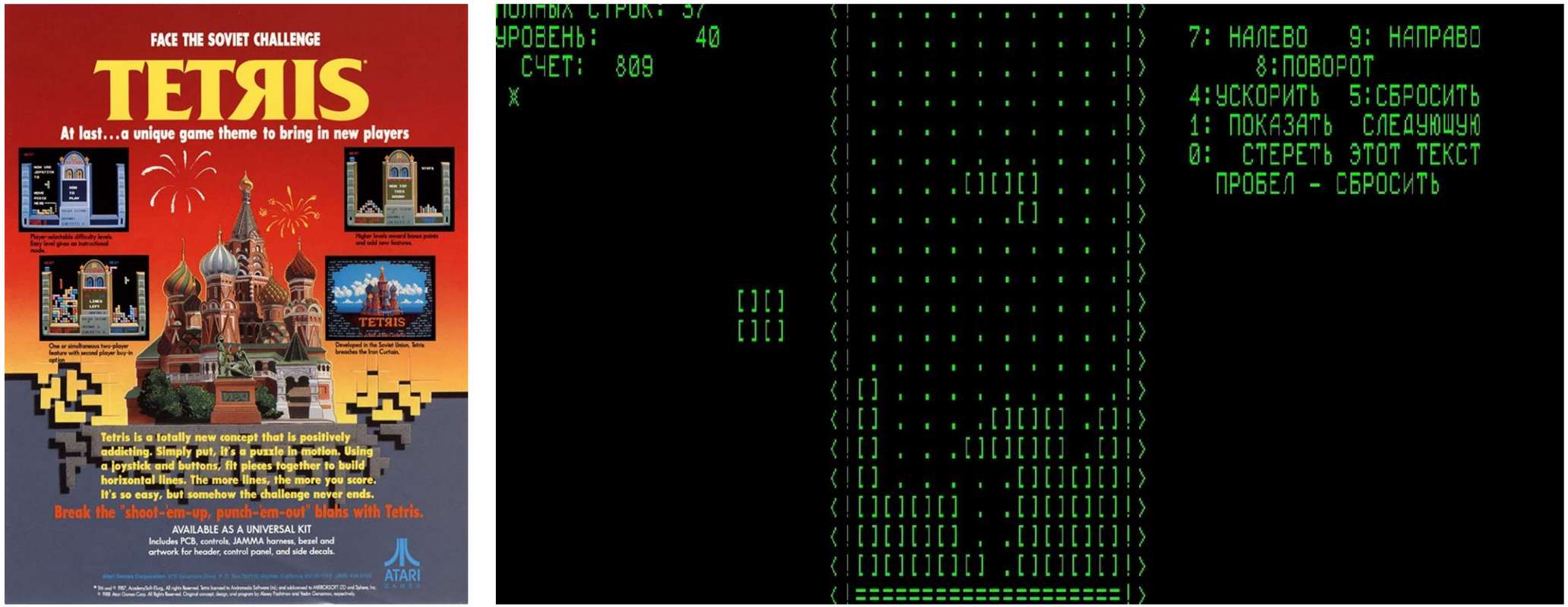

Figure: Flyer of the puzzle video game *"Tetris"* by Alexey Pajitnov (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: SUPER MARIO BROS. (1985)

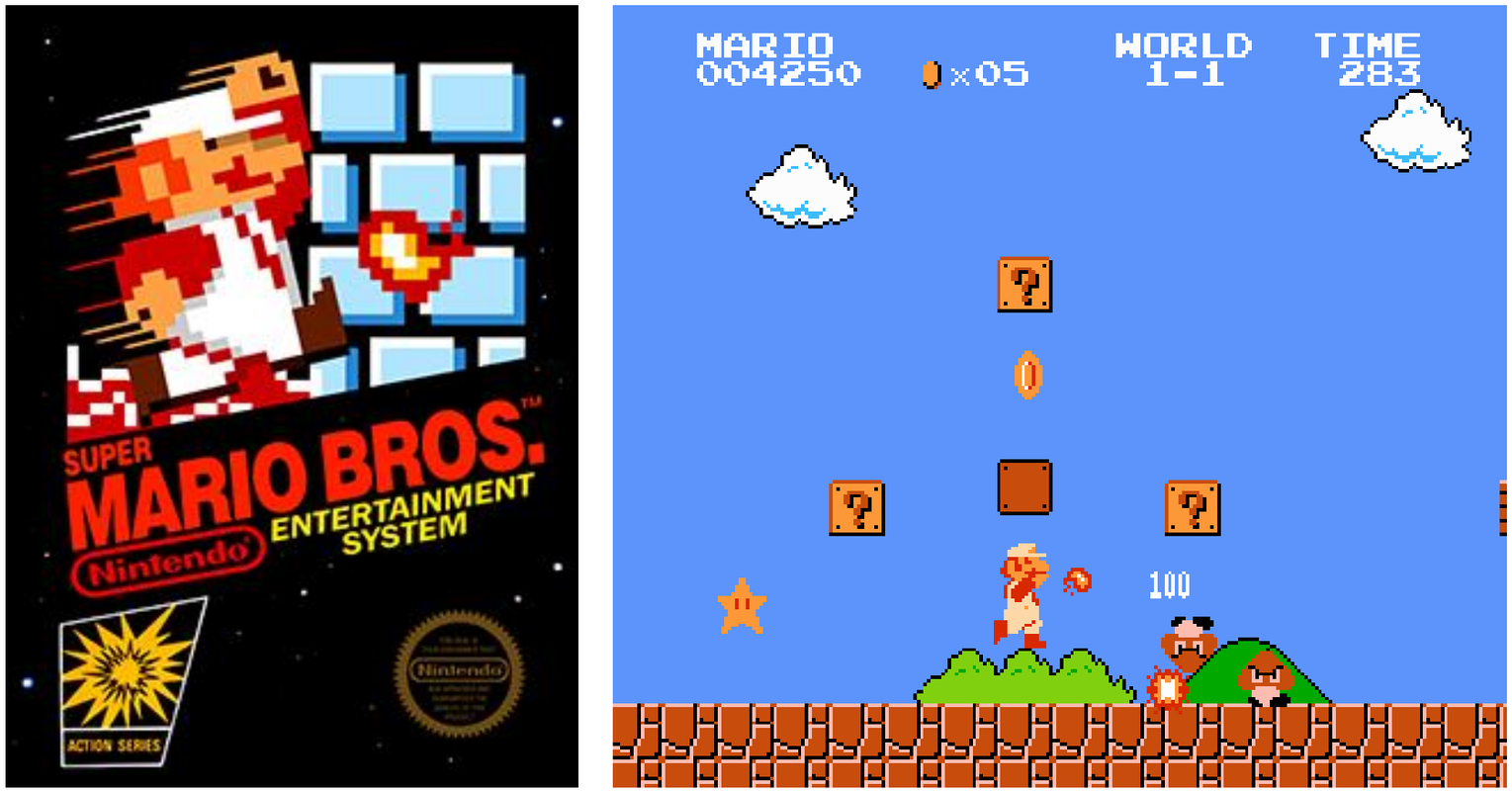

Figure: Cover of the platformer video game *"Super Mario Bros."* by Nintendo (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: GHOSTS 'N GOBLINS (1985)

Figure: Flyer of the platformer video game *"Ghosts 'n Goblins"* by CAPCOM (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: SUPER MARIO KART (1992)

Figure: Cover of the racing video game *"Super Mario Kart"* by Nintendo (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: MORTAL KOMBAT (1992)

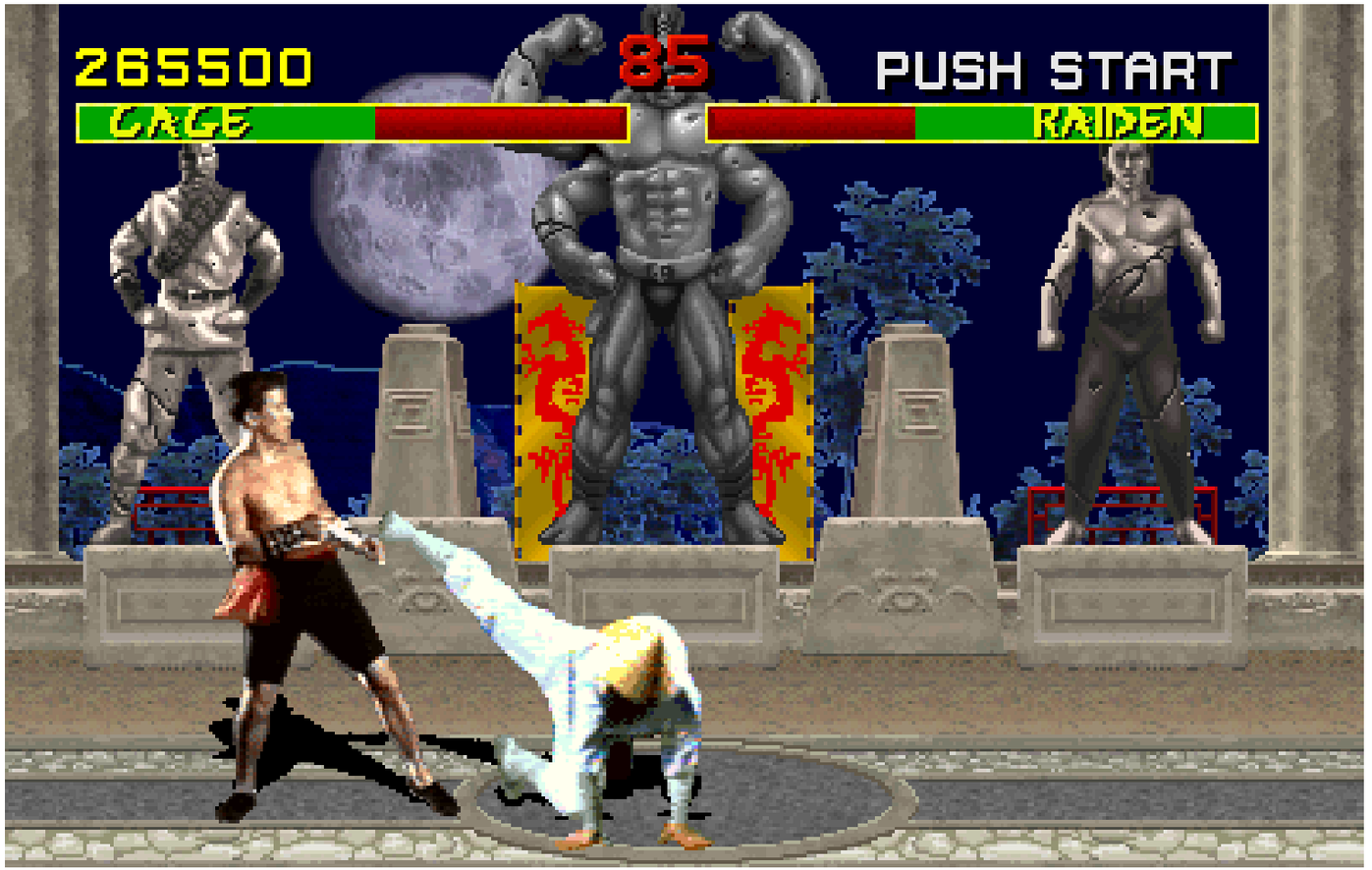

Figure: Flyer of the fighting video game *"Mortal Kombat"* by Midway (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: DOOM (1993)

Figure: Cover of the first-person shooter video game *"Doom"* by id Software (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: DIABLO (1997)

Figure: Cover of the action/role-playing video game *"Diablo"* by Blizzard (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: THIEF (1998)

Figure: Cover of the stealth video game *"Thief"* by Eidos (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: WORLD OF WARCRAFT (2004)

Figure: Cover of the MMO-RPG video game *"World of Warcraft"* by Blizzard (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: GRAND THEFT AUTO 5 (2013)

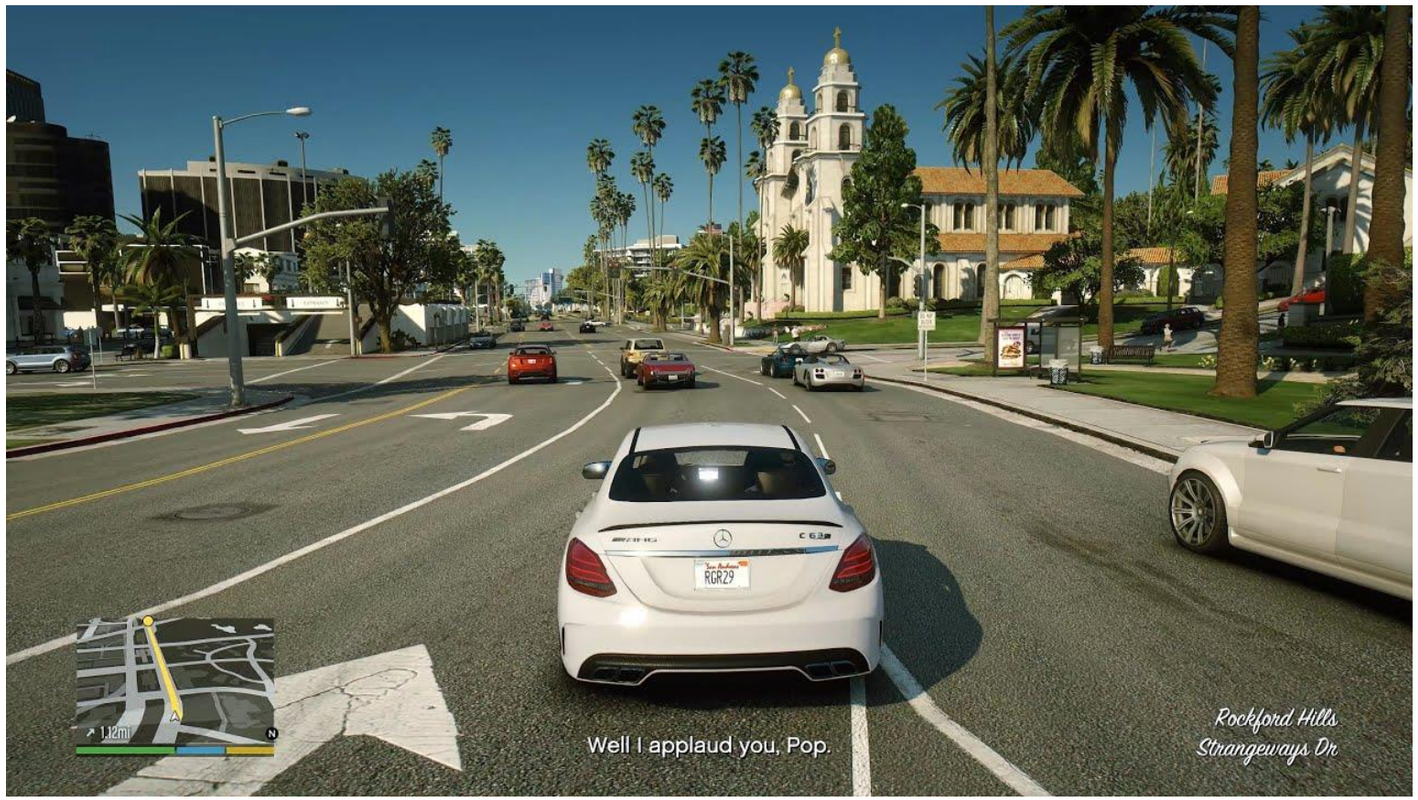

Figure: Cover of the action-adventure video game *"Grand Theft Auto V"* by Rockstar Games (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: RED DEAD REDEMPTION 2 (2018)

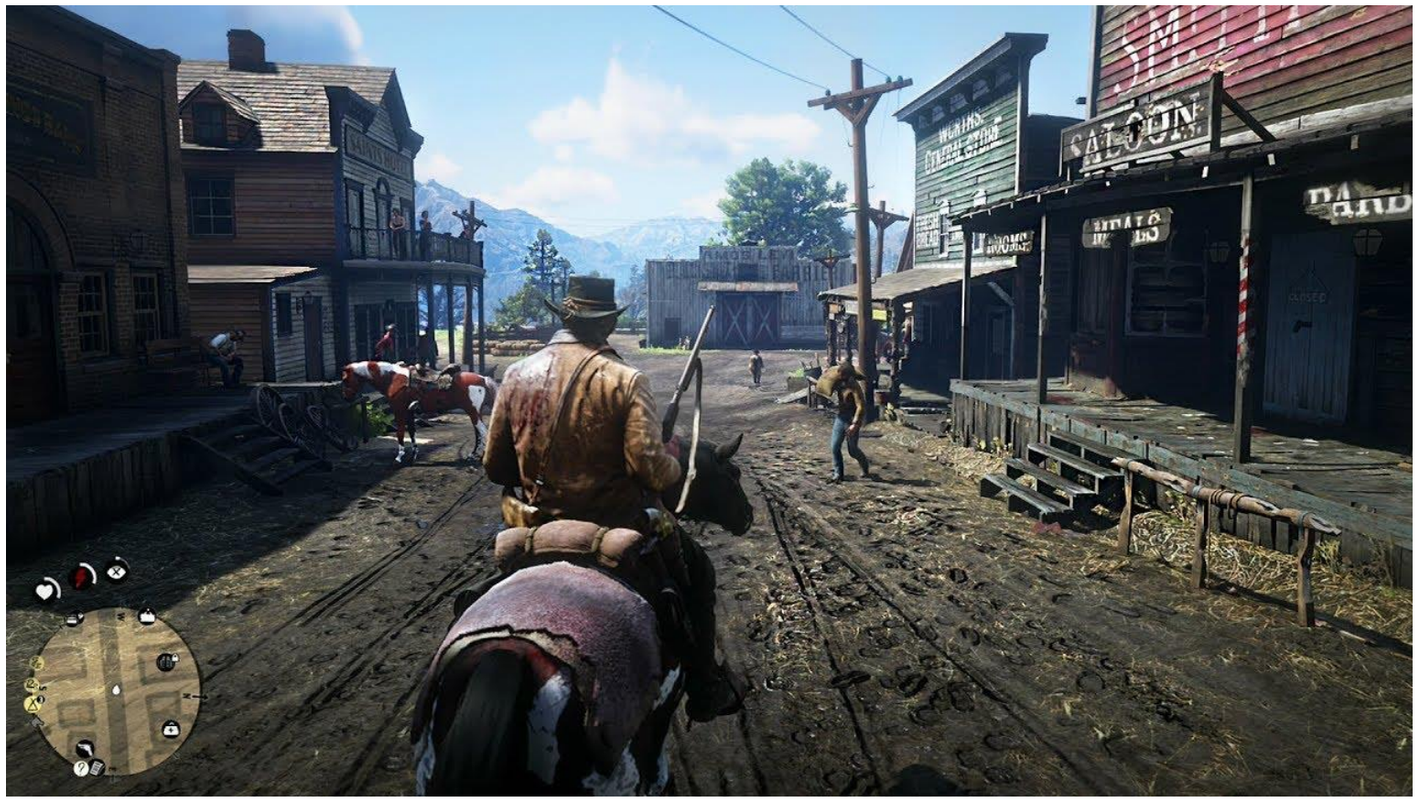

Figure: Cover of the action-adventure video game *"Red Dead Redemption II"* by Rockstar Games (left), and a screenshot during gameplay (right).

VIDEO GAME HISTORY: GOD OF WAR (2018)

Figure: Cover of the action-adventure video game *"God of War"* by Sony Interactive Entertainment (left), and a screenshot during gameplay (right).

WORK-IN-PROGRESS

APPENDICES

Appendices

- Video Game Terminology
- References

VIDEO GAME TERMINOLOGY

Campaign: The main story of the game being played (solo, co-op, multi-players).

Checkpoint: A location in a game level used as a respawn point whenever a player dies (or stops playing), usually representing as a safe point (to avoid losing all progress).

Co-Op: Also called cooperative gameplay, consists in gameplay designed for cooperative multi-player actions.

Cutscene: A cinematic clip in the video game, usually uncovering part of the narrative.

Difficulty: The setting at which the player chooses to play: usually from *"easy"* to *"hard"*.

Game Over: The game status when the player has lost (player dead, time over, etc.).

Hit Points: Also called life points, they represent the player life in-game, or how much damage the player can take before dying in-game.

VIDEO GAME TERMINOLOGY (2)

Mana/Magic Points: They represent how much magical power a player has in-game.

Map/Level: Part of the game world.

NPC: Also called non-player character, this is a character populating the game world for the purpose of giving tips, making the game world more realistic, etc. Usually the player can interact with NPCs, but he cannot control them.

PC: Also called player character, this is a character that can be controlled by a player (the opposite of an NPC).

Sidequest: A quest that is not related to the main quest or campaign of the game. These are usually optional (non-required) quests in which the player receives bonus rewards or skills for completing them.

VIDEO GAME TERMINOLOGY (3)

XP: Also called experience points, they represent the amount of experience gained by the player. They are usually used in leveling-based games, in which the player advances by incrementing his level or skills (gaining better/new abilities, etc.).

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