

# 50.033

Foundations of  
**Game Design**  
and Development

## PRINCIPLES

of Game Design (Part 2)

- Asymmetry & Balance
- Genre-specific principles

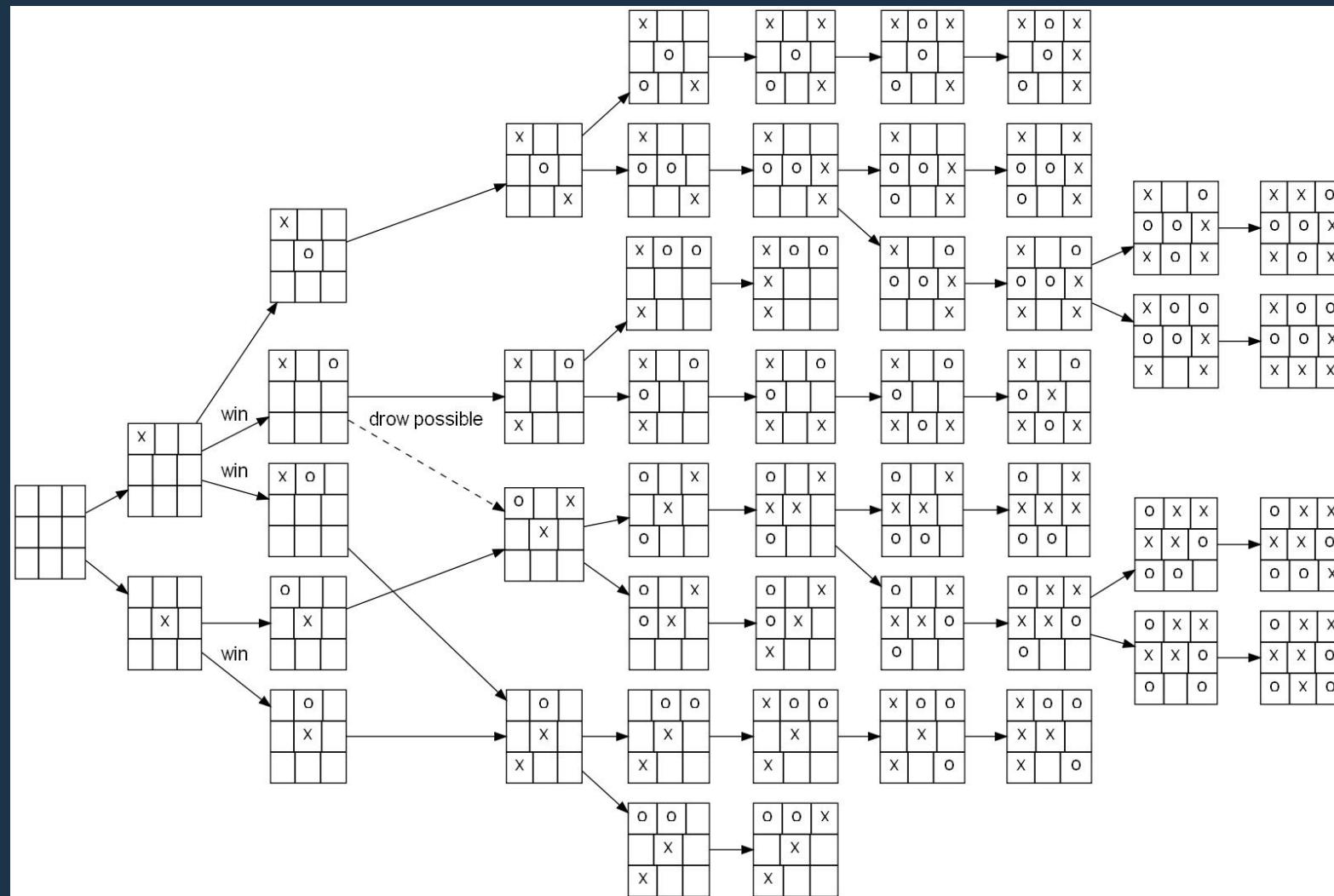
# WHY MORE PRINCIPLES?

- People play games for different reasons
  - Casual entertainment, addiction, career, education, etc
- Various game genres came about to fulfil these reasons
  - Each genre has its own design peculiarities
  - Think about them as quick tips for each genre

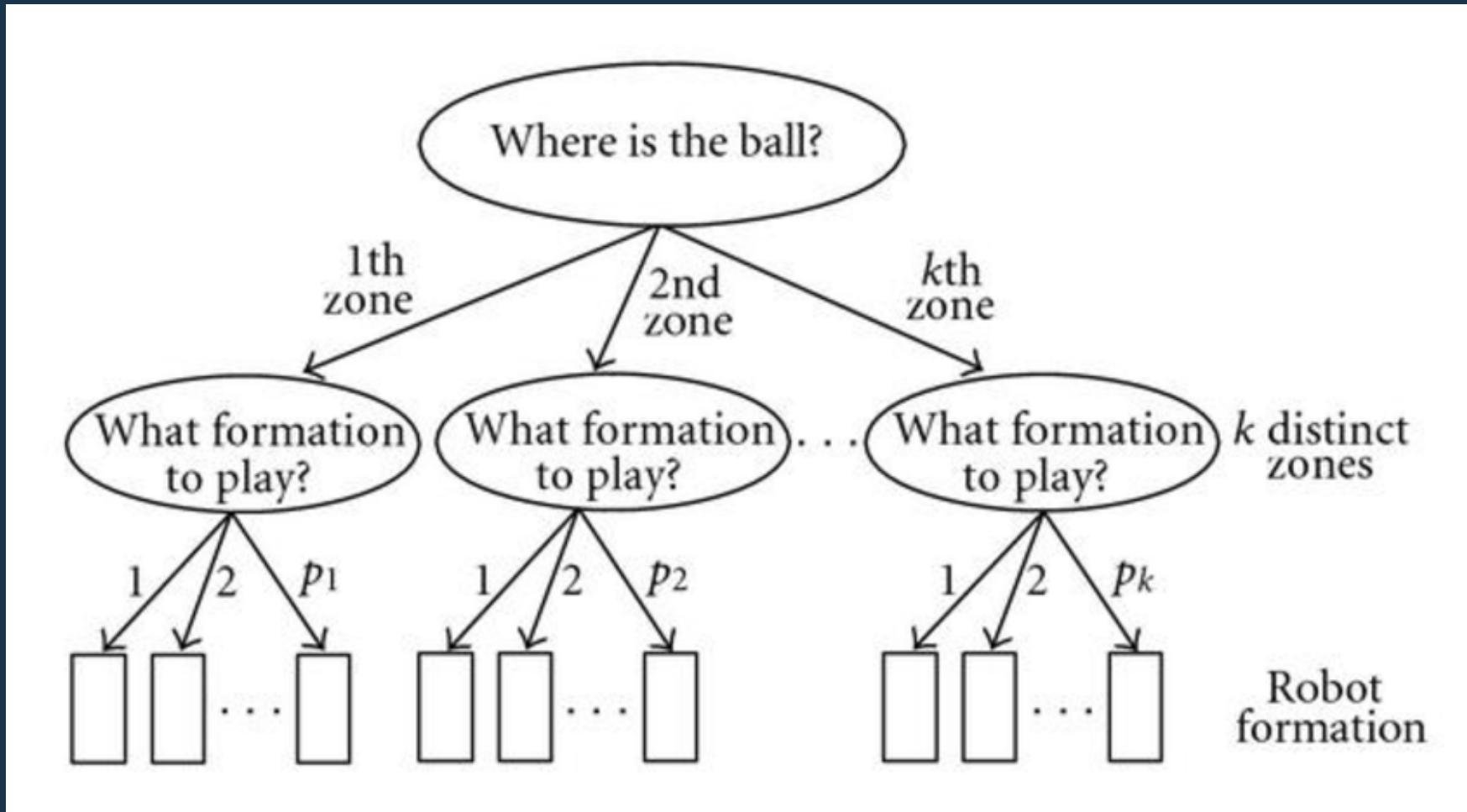
# BALANCE

- Game balance should be foremost in your mind whenever you introduce a new feature or concept.
- *For every reward, there must be risk. For every attack, there must be a defense. Balance is the key to a great game experience.*
- So we sort of get the idea of how a game can be balanced, but more formally, how do we define balance in a game?
- Need to first: *reduce game into strategic decisions*

# GAME DECISION TREE



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# GAME DECISION TREE

- For bigger games, just chart out relationship between *missions* (or quests)
- This tree will tell us how many missions or quests a single player will go through in average game
- Helps us to **detect and avoid loops**

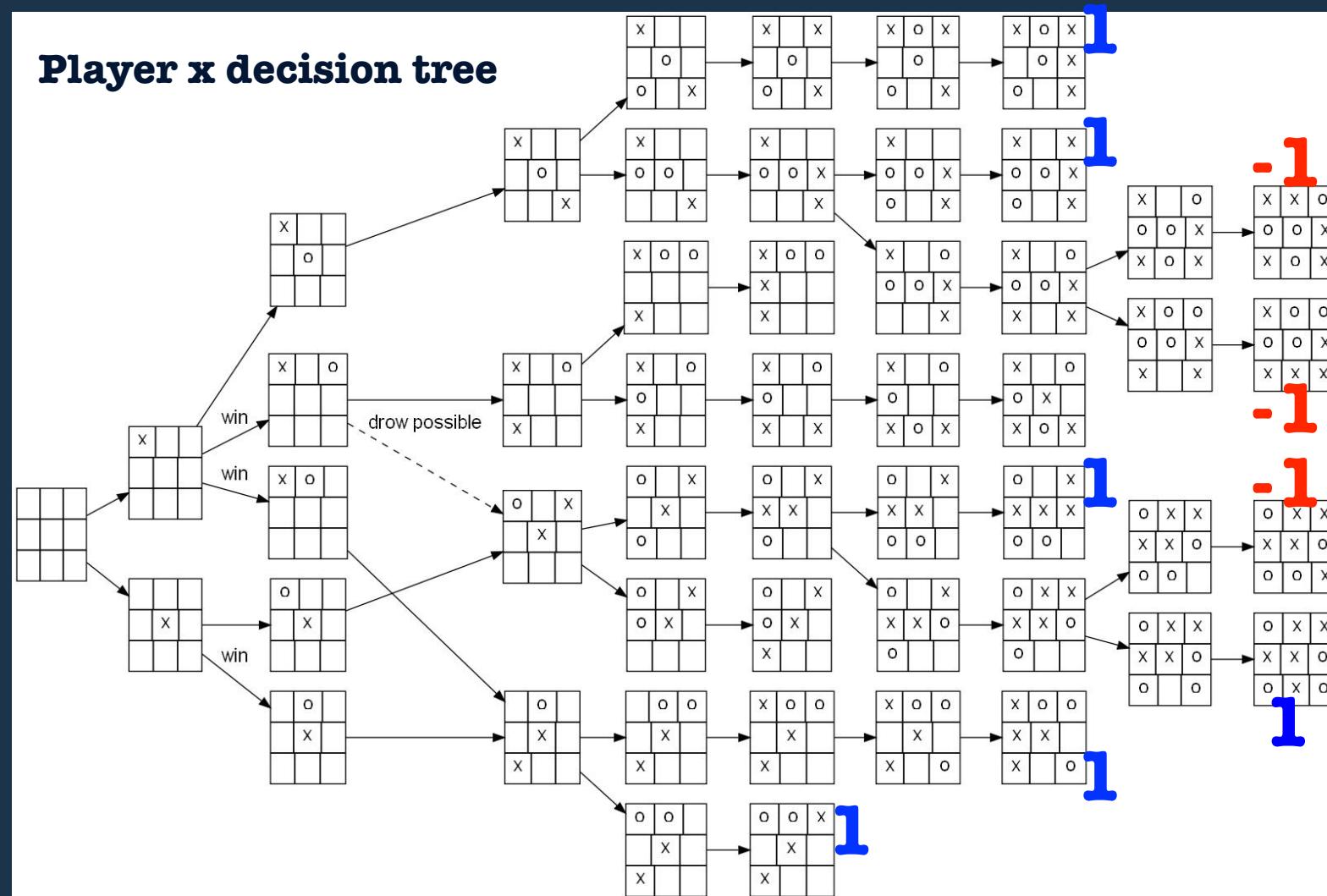
# GAME DECISION TREE

- So how does game decision tree help us find *balance*?
- So each ‘player’ (be it AI or humans) has a decision tree : consisting of strategic decisions they may take in a game

# GAME DECISION TREE

- We augment the tree and write *rewards* at the nodes (or just the leaves, depending on context) to indicate which strategy is best for each player
- Some games only score ‘points’ at the end, especially zero-sum games like chess, tic tac toe, etc
- Some games build up profile gradually, e.g: RPG games

# GAME DECISION TREE



# BALANCE

- After we have the decision tree and the *rewards*, we need to assume that all players are *intelligent*
- *Intelligent*: both players will make a **rational** decision that maximise their rewards and then minimise the opponent's rewards (minimax)

# BALANCE

- **Optimal solution** is also known as *dominant strategy*, or *saddle point*, or *degenerate strategy* (you may also know it as *game spoiler*, or *OP strategies*)
- Once the player finds it, there's no other reason to do anything else
- No matter how many times the game restart, it will result in the same outcome
- That's why plain 3 by 3 tic tac toe (where both players are intelligent) is *boring*

# BALANCE

- Please avoid *optimal solution* like a plague **if your game is a multiplayer game**
  - Recall **rule#22** : add a small amount of randomness to AI calculations, and octalysis core drive **unpredictability**
  - Recall formal element *outcome*: the outcome of a game has to be **uncertain and unpredictable** to foster player interest (don't know how much points will be scored, or who will win)
  - Optimal solution in multiplayer game makes it seem unfair

# BALANCE

- A game is **balanced** if it has **no optimal solution (again for multiplayer games)**
- It can be avoided by adding conflicts and dilemmas
- Then there's no obvious and optimal solution to the game
- Don't have any strategies that can lead to win-win situation at all times *very easily*
  - **No particular move can beat all moves**

# ASYMMETRY

- It might sound counter-intuitive to make a game balanced by being asymmetric
- Remember: an asymmetric game need to be **fair**
- You make your *resources* asymmetric, but overall, the game has to be balanced
  - E.g: combine asymmetrical objectives with asymmetrical starting positions for a real balancing challenge. In this case, your motive might be to add variety or evoke a real life situation.

# ASYMMETRY

- 3 kinds of asymmetries:

- **Asymmetric ability**

- Explicit: exists in the game level (resources, view area)
    - Implicit: exists in player level (player skills)

- **Asymmetric Goals**

- Different goals or
    - same goal but achievable from different strategy

- **Asymmetric Information and resources distribution**

# ASYMMETRY

- If played properly, each opponent will have roughly the same chance of winning, regardless of the other factors (balance)
- Asymmetry triggers the core drive: **scarcity** and **unpredictability**
- Remember, if you make an item scarce, you need to give a big reward, thus making the game balanced

# ACTION GAMES

- **What you want players to do:**

- Keep them moving and involved at all times
- Create adrenaline rush
- Engage hand/eye coordination and quick reflexes
- Tactical thinking on the fly

- **What you don't want them to do:**

- Deep strategic thinking
- Idle around with nothing to do
- Get bored

# ACTION GAMES

## ● Step 1: Selecting POV

- First person or third person?
- First person is more fast-paced and immersive
- Third person encourages stronger sense of identification with the character played



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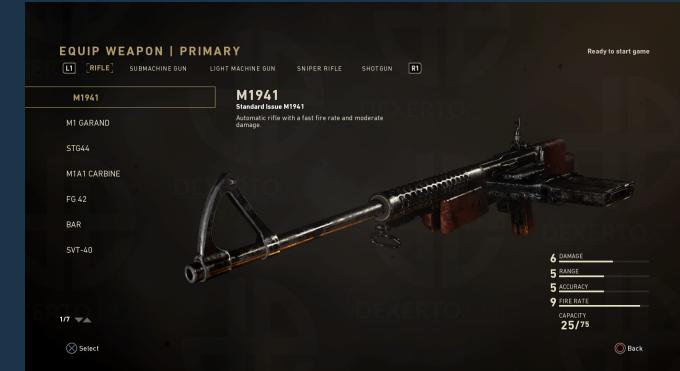
# ACTION GAMES

- Step 2: Level design is KEY

- (later)

- Step 3: Weapons

- Decide your theme: Fantasy, science fiction, real world
  - Don't create OP weapons
  - Make it have different characteristics, dont create a bunch of weapons with the same function
  - Make it *flashy*: use nice special effects and sound



# ACTION GAMES

## ● Step 4: Engine

- Most of them are expensive, but for a 3-months project we can get away with free engines and / or Unity
- Doesn't have to be 3D, there are also 2D action games
- Remember to be realistic that this is a game you have to complete by the end of 13 weeks in your busiest term
- Don't code from scratch



# ADVENTURE GAMES

- **What you want players to do:**

- Keep exploring and do a lot of puzzle solving
- Typically, the player is the hero, but of course you can always be the villain if you want to

- **What you don't want them to do:**

- Get confused and lost
- Feel pointless in the game

# ADVENTURE GAMES

Thank you for selecting the Nintendo® Entertainment System™ Super Mario Bros.™ Pak.

## OBJECT OF THE GAME/GAME DESCRIPTION

One day the kingdom of the peaceful mushroom people was invaded by the Koopa, a tribe of turtles famous for their black magic. The quiet, peace-loving Mushroom People were turned into mere stones, bricks and even field horse-hair plants, and the Mushroom Kingdom fell into ruin.

The only one who can undo the magic spell on the Mushroom People and return them to their normal selves is the Princess Toadstool, the daughter of the Mushroom King. Unfortunately, she is presently in the hands of the great Koopa turtle king.

Mario, the hero of the story (maybe) hears about the Mushroom People's plight and sets out on a quest to free the Mushroom Princess from the evil Koopa and restore the fallen kingdom of the Mushroom People.

You are Mario! It's up to you to save the Mushroom People from the black magic of the Koopa!

Please read this instruction booklet to ensure proper handling of your new game, and then save the booklet for future reference.

## ● Step 1: Good story is KEY

- You can't have a good adventure game without a good story
- (later)

# ADVENTURE GAMES

- **Step 2: Create puzzles as threat to the player's progress**

- To get ideas, think it from villain's POV. How will the villain interfere with your character?
- The puzzle must make sense, give enough clues
- Puzzles aren't roadblocks to slow down player, help the player along



# STRATEGY GAMES

- **What you want players to do:**

- Solve puzzles or challenges, and feel smart by the end of it
- Motivated to continue the game

- **What you don't want them to do:**

- Feel stupid

# STRATEGY GAMES

- **Step 1: Decide how much resource management and combat element your game will have**

- Pure resource management: Roller coaster tycoon, Sim City, Harvest Moon
- Mixture: Age of empires, Warcraft, Starcraft
- Pure combat: Close combat



# STRATEGY GAMES



## ● Step 2: Balance is KEY

- Whatever your game is about, it has to be balanced
- Finding balance can only be done iteratively: **test and tweak**
- Stuffs in your game that have to be balanced: resources such as consumable, weapons, and AI

# FIGHTING GAMES

- **What you want players to do:**

- Quickly learn the basic movement
- Recognise the pros and cons of each character instantly
- Engage their attention for 2-3 minutes
- Freely have the option to restart the game, change character, and pause the game

- **What you don't want them to do:**

- Having to close the program to restart the game
- Feel that the game has a steep learning curve

# FIGHTING GAMES

## ● Character animation is KEY

- Players will stare at (1) static backdrop and (2) characters at all times
- Characters must have unique look that convey *personality*
- Animations : visual and auditory effect must be satisfying



# EDUCATIONAL GAMES

- **Step 1: Decide what players should know at the end of the game**

- Whatever the knowledge the game is trying to teach, you must make sure the player knows it at the end of the game

- **Step 2: It is also very important to define target age**

- Your content has to be *age appropriate*
- If the game is for kids then consult some experts

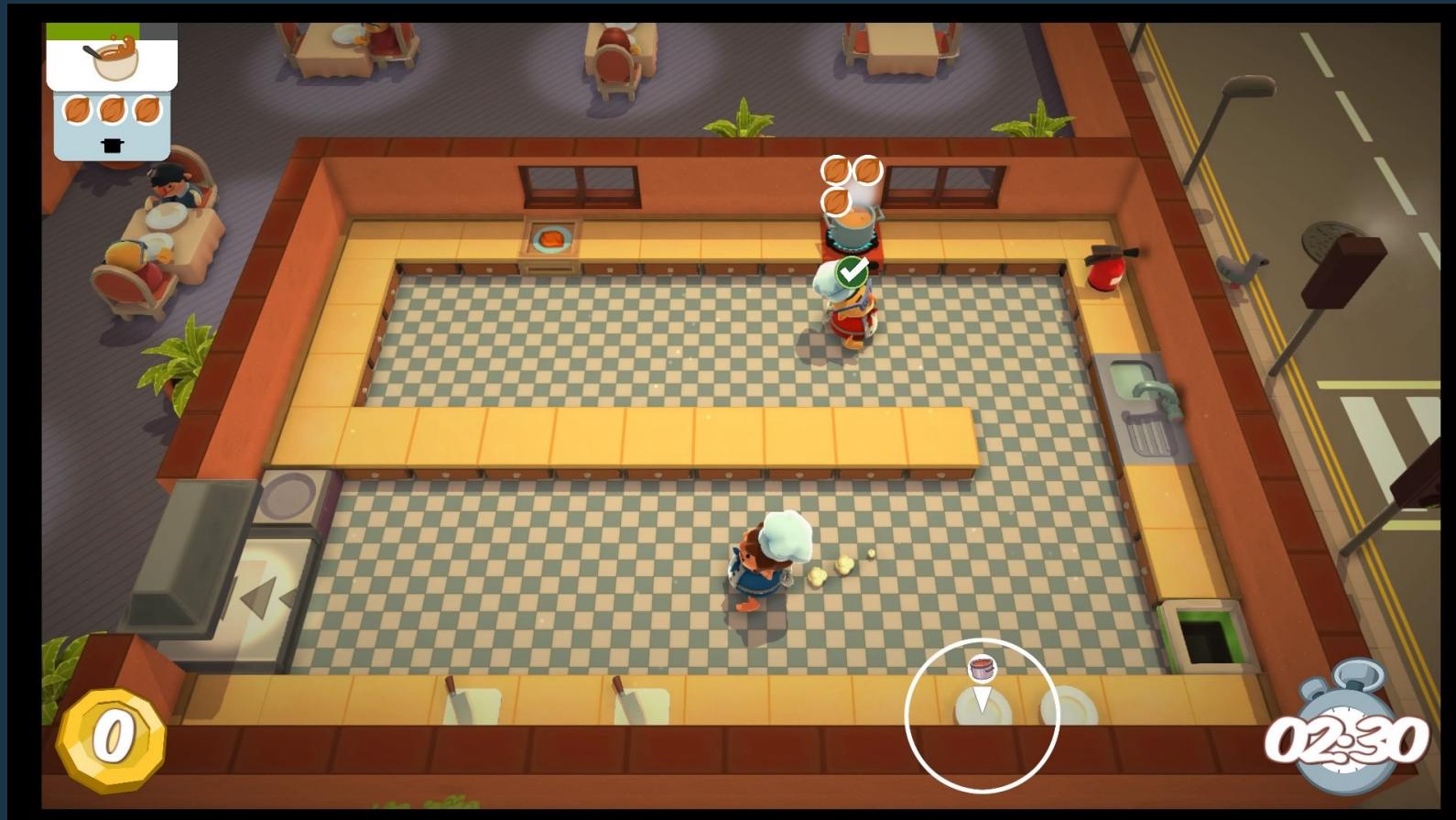
- **Step 3: Always respect the audience**

- People are smarter than you think
- Guide, don't spoon-feed

# LEVEL DESIGN

- Begin with *concept work*:
  - sketch things out,
  - think about why its there in the first place:  
typically each level introduces new mechanism  
with increasing difficulty

# LEVEL DESIGN



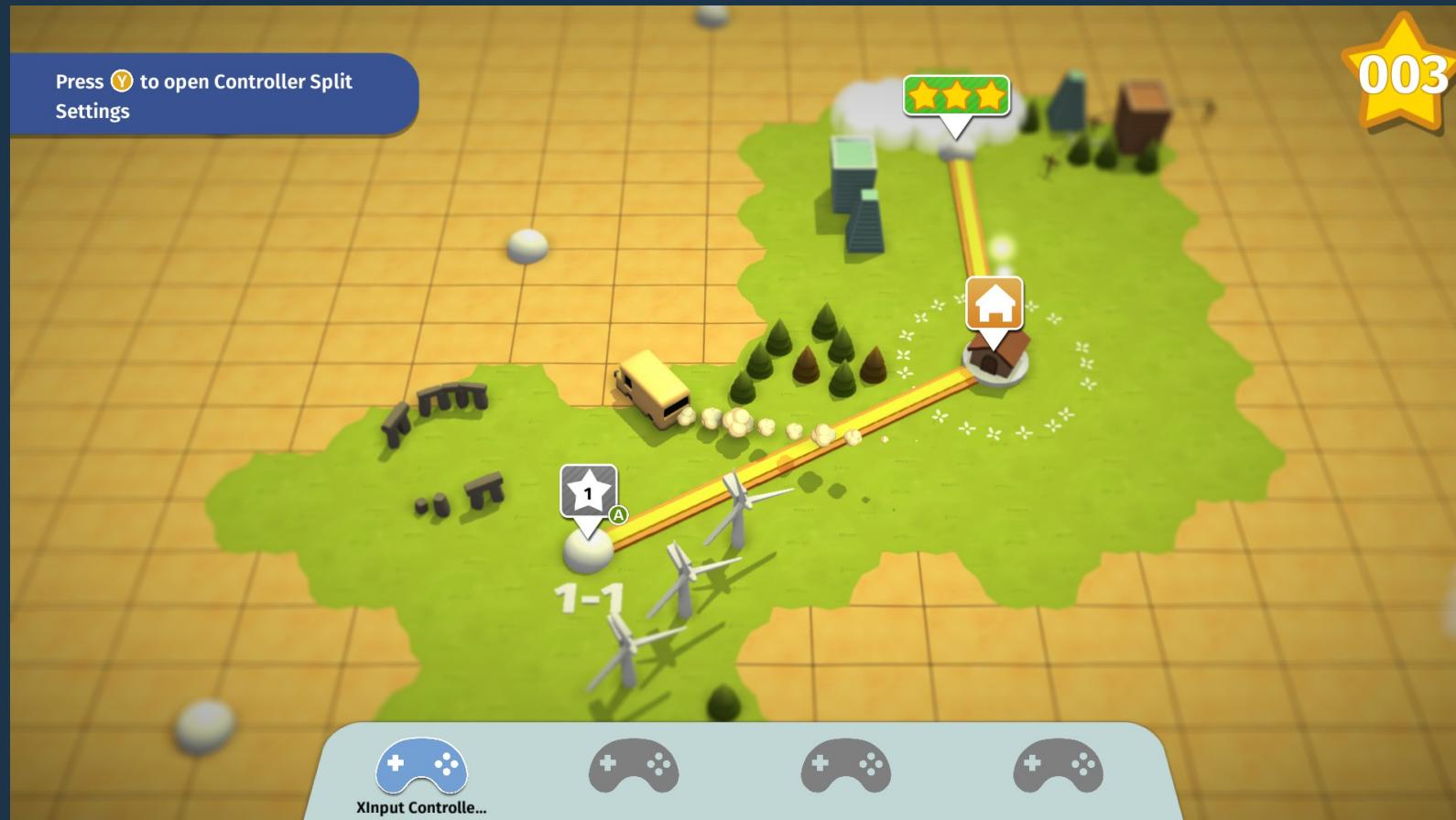
- *Overcooked*: Level I - provide guidance, keep it simple, introduce players to the game mechanics

# LEVEL DESIGN

- Then introduce *progression*:
  - Include breaks between action
  - Create gradually challenging levels, ease the players into it
  - Vary the pace and make sure there's always enough stuffs for the players to do at any given time

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# LEVEL DESIGN



- *Overcooked*: the break between levels where players navigate in the main menu

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# LEVEL DESIGN



- *Overcooked*: Level 2 - Increase difficulty slightly by pressing the players against time

# LEVEL DESIGN



- *Overcooked*: Level 3 - More variations to cook, add in hazards in the map, by this time the players should've mastered basic mechanics

# LEVEL DESIGN



- *Overcooked*: Level 3 - More physical obstacles to complete the task (slippery floor + characters may die and respawn in 5 seconds)

# LEVEL DESIGN



- *Overcooked*: Level 4 - More physical obstacles to complete the task (dynamic floor + characters may die and respawn in 5 seconds)

# LEVEL DESIGN



- *Overcooked*: Level 5 - More physical obstacles to complete the task (lava floor + characters may die and respawn in 5 seconds)

# LEVEL DESIGN



- *Overcooked*: Final boss, combines all the skills learned from previous levels. Should be the toughest level to pass.

# LEVEL DESIGN

- More tips:

- If you make the player work hard for something, make sure your reward is worthy
- If you want to ‘break the level’ : i.e to take away something that has been acquired before, make sure you give a good reason to do so

# STORYTELLING

- A quick fundamentals of how tales are told
- **The three act structure:**
  - *The beginning:* Get player's attention by showing that something is wrong. Fill in the backstory later

# THE BEGINNING

- Set a location clearly: *the Sanctuary*
- Capture player's attention with a problem: *A mysterious star fell down on the Cathedral, Deckard Cain disappeared*
- Make the player goal apparent from the beginning: *Investigate the incident and find Deckard Cain*
- Poke the player's curiosity by something unexpected: *The star was a person, but he lost his memory*

# THE MIDDLE

- Fill in with backstory: *The stranger's (Tyrael) backstory, that he's actually a fallen angel with a mission*
- Give long-term goal: *Protect humanity from the forces of Hell (well, basically defeat Diablo in the end)*
- Work through inner conflicts and overcome them: *Plot twists, some characters die, betrayal*
- Experience character growth: *Character gains EXP, gets stronger and more complex*

# THE END

- Experience carthasis when the hero meets his / her goal, or
- Give a sad ending, depending on the storyline
- *Example: Obviously, the player will have to fight Diablo as the final boss, and when he wins, he saves the world*

# MORE TIPS (ONLINE SOURCE)

## ● Create the world:

- Which continents does this world have?
- Which cities are there?
- Who lives here?
- Are there interesting landmarks?
- What could spawn conflict in this world?
- How did the nations come to their current form?
- Are there contested borders?
- Do people have enough resources? (food, water, wood etc)
- What technologies exist? (magic? teleportation?)
- Are there specific cultures?
- Is there free trade? Freedom of religion?
- What kinds of governments are there?
- Are people thriving or struggling in this place?

# MORE TIPS

- Create the characters:

- In what environment did they grow up? (Link this to the world design!)
- What were they like at age 5? At age 15? 30? 50?
- Do they have particular skills? (Use this for your game mechanics!)
- Were there life-changing events in their past?
- What is their personality like? How would they react in specific situations?
- What do they look like?

# MORE TIPS

- Write the grand storyline:

- Which nations / rulers are in conflict?
- What is the history of these nations?
- What is the role of the hero in the grand scheme of things?
- Is there an event (in the past or future) that shakes up the world?
- Which unknowns are revealed along the way?
- How are different characters plotting and clashing?

# MORE TIPS

- Write the game story:
  - Is this moving the story forward?
  - Is this revealing something of a character?
  - Can a third-grader understand it?

# MORE TIPS

- Implementing the story in game:
  - **Cutscenes** – simply pause the gameplay and show some dialogue or pre-scripted action.
  - **Environment** – Your levels tell a lot about the world and its history.
  - **Enemies** – The bad guys tell a story by just being there.
  - **Allies** – Your teammates can make scripted decisions that progress the story.
  - **Loading** screens – give them something to read or look at while waiting.

# SUMMARY

- Briefly discussed specific design issues in some game genres
- Basics of level design
- Basics of storytelling