GAME DESIGN

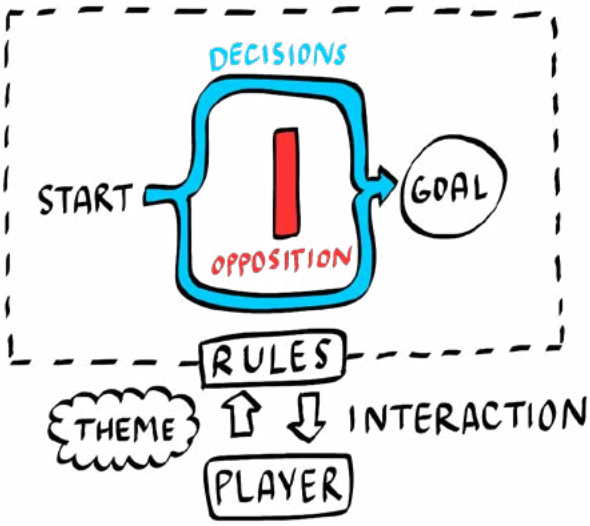
Module 3: Meaningful Decisions & Opposition

A URF ACADEMY COURSE | RIOT GAMES
VERSION 1.0

Big Ideas

Purpose

This module **focuses on the Opposition and Decision** portion of the Game Design Framework. Opposition is necessary to have players make meaningful decisions. This can present itself in the form of player or designer created opposition.



Student Objectives

Lesson 1: Problem Solving and Iteration

- Fast iteration cycles to solve problems are essential to designing a high quality game.

Lesson 2: Flow and Core Game Loop

- Flow states are important to immerse players in the game experience and increase enjoyment.
- Many different factors affect flow in different ways.
- Designing a "**core game loop**" increases immersion and allows players to progress and gain mastery.

Overview

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Materials

Teacher

- Computer / Projector
  To present external links

Students

- Paper / Pen

Us vs It Game Materials

Per group

- 1 x Game Board
- 1 x Action Sheet
- 4 x Tank Piece
  - Any 4 similar looking objects with facing will suffice *(E.g., a little figurine)*.
  - Use 4 quarters with an arrow (for facing) taped on, if there are no other appropriate objects.
- 1 x Robot Piece
  - Any miscellaneous object will suffice.

TOTAL TIME: 60 MINUTES

Lesson 1

Problem Solving and Iteration

Students will learn about the concept of **opposition** in game design by "programming" a balanced game of Us vs It.

Balancing the game is the primary output of this module.

By continually iterating, changing and playtesting their games, students will learn how to use the **playtest > analyse > iteration** loop to work towards putting the game's players into a **flow state** (defined below).

35 MINUTES

Us vs It: Setup and First Playtest

SETUP: 10 MINUTES

1. **Give each group a different action sheet.**
2. **Each group names their robot.**
   Spend no more than 1 minute on this

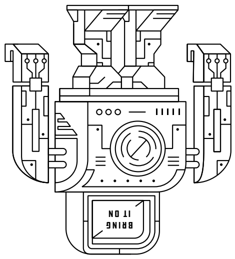
FIRST PLAYTEST: 25 MINUTES

3. **Introduce the game premise:**

   A group of scientists programmed a giant robot to protect their town from invaders. But something has gone horribly wrong and now the robot is charging towards the town, destroying everything in its path. Players must work together and each control a tank (four in total) to prevent the rogue robot from reaching their town.

   The robot and four tanks alternate turns to see who reigns victorious.

4. Place the game boards together as shown in the **diagram on the following page** with the pieces in their starting locations and tanks facing forwards.



URF ACADEMY

Robot Instructions

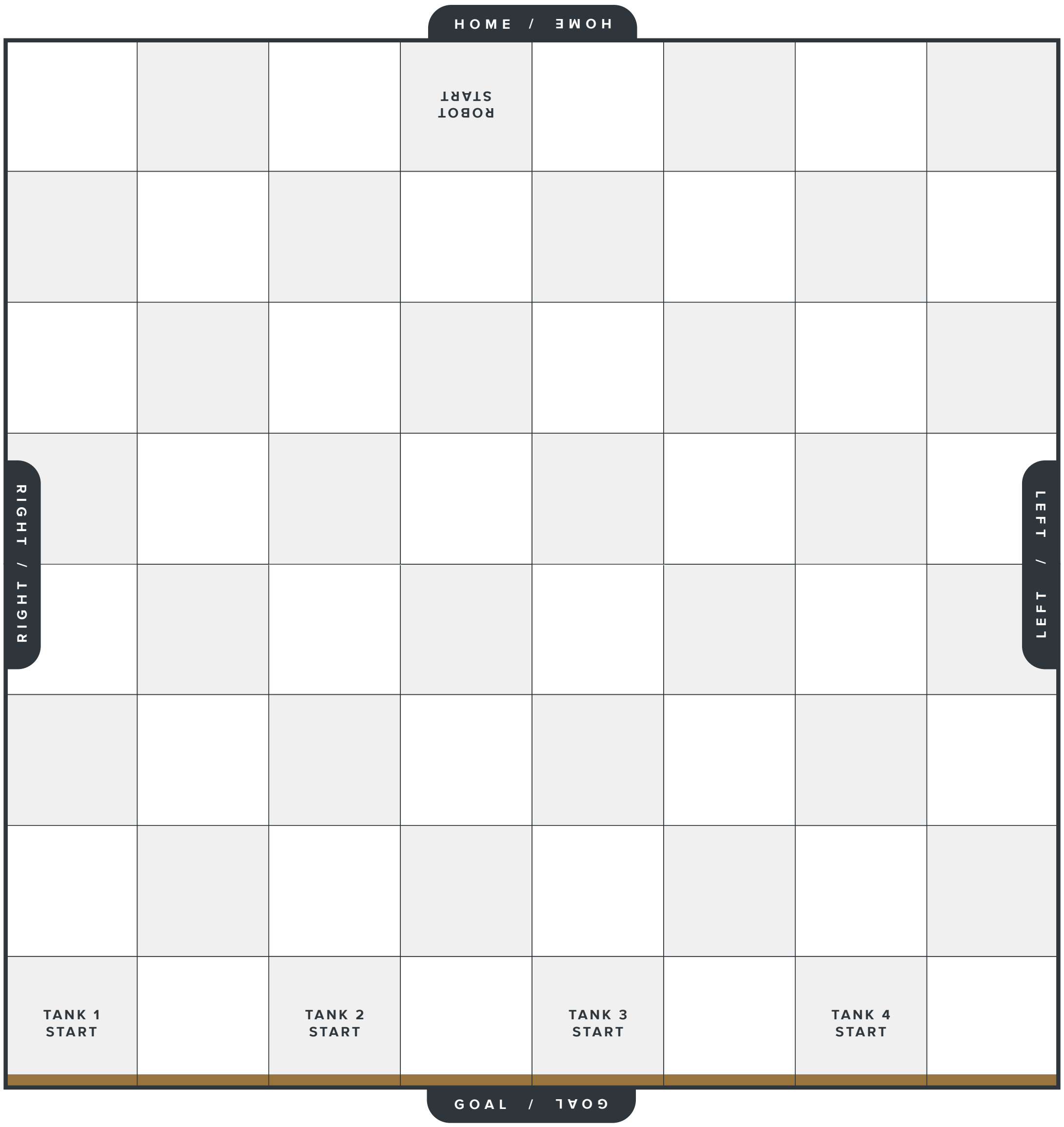
Each turn the robot attempts to perform the actions on its list in order from 1 to 10.

If an action cannot be performed then skip it and move on to the next action.

When the robot finishes the 10th action then its turn is over and the tanks start their turn.

ROBOT HIT POINTS

FULL HEALTH										SELF-DESTRUCT
10	9	8	7	6	5	4	3	2	1	0



URF ACADEMY

Tank Instructions

Choose **3 ACTIONS** each turn, in any combination:

A) Shoot straight forward for 1 damage. You may shoot over other tanks.

B) Move forward 1 space. You may not move into the same space as another tank or the robot.

C) Rotate to face any direction.

TANK 1 HIT POINTS

4	3	2	1	0

TANK 2 HIT POINTS

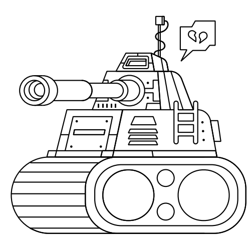
4	3	2	1	0

TANK 3 HIT POINTS

4	3	2	1	0

TANK 4 HIT POINTS

4	3	2	1	0



CORE GAME LOOP

5. **Robot executes its complete sequence by enacting the actions on the Action Order list in order.**
   The robot is not on the players' team, but the players need to execute the robot's action order.

6. **Each of the tanks take their turn in order.**

   - Don't alternate a robot's turn in between each tank turn.
   - Tanks can use up to 3 of their abilities (as indicated on their sheet) and can use multiple of the same ability in a row if they desire. Players are on the tank team.

7. **Repeat until a victor is decided.**

   - The robot wins if it passes the goal line or if all the tanks are destroyed.
   - The tanks win if the robot is destroyed (hit points reach 0).

Teacher's Context: Five Whys

5 MINUTE READ

Five Whys is a problem solving technique pioneered and used to great success by Toyota founder Sakichi Toyoda.

Compared to modern standards, it is not the most robust problem solving framework, but it has great appeal for memorability and simplicity for URF Academy students.

Discovering the **root cause** of a problem is important to ensure that the actual problem is being treated, not the **symptoms** of a problem.

Treating the symptoms of a problem rather than the root cause will result in either the same problem reocurring or a different problem occurring due to the same root cause. In a professional setting, this costs time and resources.

Five Whys starts with a first order problem and seeks to incrementally discover the root cause.

It uses the answer of each "why?" question as an input to the next question. For simple problems, only several why's need to be asked.

Students will typically find it difficult to generate the first order answer to the initial problem. *E.g., Why did the robot do a lot of damage?*

In these cases, guide them by having them write the first thing that pops into their head. They may require 5, 6, 7...whys to answer the problem. This is fine and encouraged. As they become better designers, they will be able to answer these problems with 1, 2, 3 whys.

There is no "one right root cause" for a problem (especially for complex problems), but it provides a reasonable place to start solving problems from.

25 MINUTES

Problem Solving and Iteration

Enduring Understanding

Fast iteration cycles to solve problems are essential to designing a high quality game.

FAILING FASTER: 5 MINUTES

1. **Talk about failing faster and show the Failing Faster video:**
   Before we describe the theory, let us first watch a video describing one of the most important lessons of design.

2 MINUTES

Failing Faster - A Mantra for Creative Thinkers by Extra Credits
https://www.youtube.com/embed/rDjrOaoHz9s?start=0&end=707

The takeaway for the students is that failure is part of the lesson and to take setbacks in stride. For every design that succeeded and went to players, ten designs failed and were scrapped. It is important to learn from mistakes and continue moving forward to creating the final product.

FIVE WHYS: 10 MINUTES

2. **Guide the students through Five Whys and why root cause analysis is helpful (fixing a superficial problem is unlikely to actually solve the core issue).**

EXAMPLES

Problem: Robot lost

Why 1: Why did the robot lose?

The tanks killed the robot.

Why 2: Why did the tanks kill the robot?

The robot didn't kill the tanks or go to the goal.

Why 3: Why didn't the robot kill the tanks or go to the goal?

The robot kept running into the wall.

The robot kept missing its abilities.

Why 4: Why did the robot keep running into the wall?

It kept using face left and move.

Why 5: Why did it keep using face left and move?

Face left and move wasn't helpful.

Conclusion: Replace a face left with face tank.

Problem: Tanks lost

Why 1: Why did the tanks lose?

The robot killed the tanks.

Why 2: Why was the robot able to kill the tanks?

The robot did too much damage.

Why 3: Why did do too much damage?

The robot had too many damage abilities.

Why 4: Why did the robot have too many damage abilities?

The robot doesn't need to have too many damage abilities.

Conclusion: Replace a damage ability with a move ability or remove a damage ability.

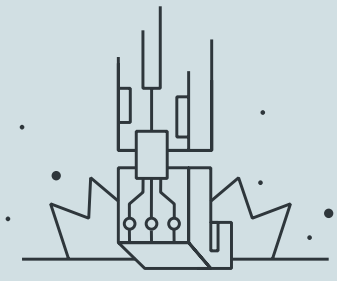
ITERATE ON ACTION ORDER: 10 MINUTES

The teacher should state that the goal is to make a "balanced" game. A balanced game is one where you could not tell whether the tanks or robots are winning until the very end.

Instruct the students to make adjustments to their game to result in a balanced game. **Explain that they can change anything, including:**

- The number of actions the robot conducts.
- The order of the actions in the action order.
- The actions in the action order.
- The number of actions the tanks can take.

There will not be enough time for a full playtest > analyze > iteration cycle, but students can iterate on their action sheet, so that they're ready for the exercise at the beginning of the next lesson.



TOTAL TIME: 60 MINUTES

Lesson 2

25 MINUTES

Second Playthrough

1. **Instruct students to conduct as many playtest > analyze (Five Whys) > iteration cycles as possible in the 25 minute period.**
   If it is obvious that the game isn't balanced and one side is definitely going to win, stop playing, figure out why, make a quick iteration and reset the game.

   Core Game Loop Reminder

   - Robot executes its complete sequence.
   - Each of the 4 tanks take their turn in order (**don't alternate a robot's turn in between each tank turn**). They can use up to 3 of their abilities (as indicated on their sheet) and using multiple of the same ability in a row if they desire.
   - Repeat until a victor is decided.

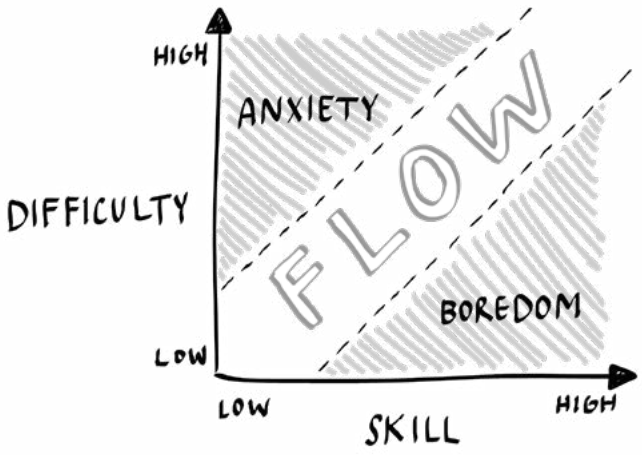
Teacher's Context: Flow and Difficulty

15 MINUTE READ

Flow is the idea of being "in the zone." While in a state of flow players lose track of time and become fully immersed in the experience. Ideally, a game (and its core loops) always put the player within the flow region to increase their immersion and engagement with the content.

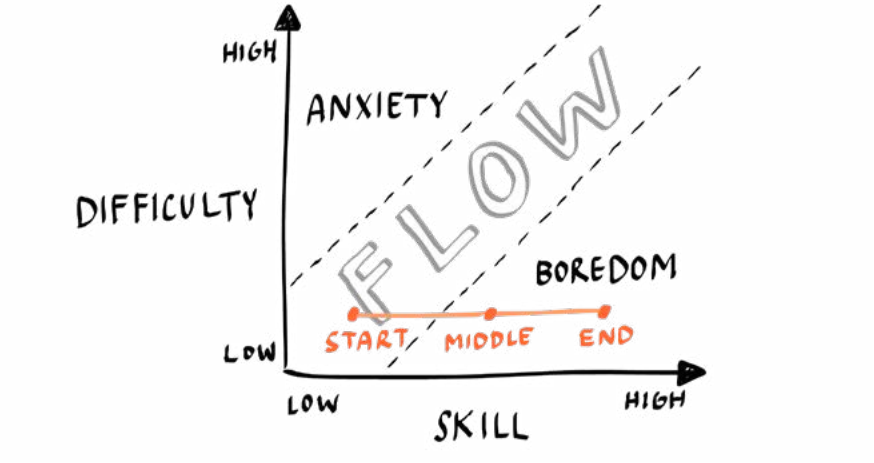
When a game experience dips out of the flow region, it results in either boredom or anxiety. The narrow flow band depicted in the diagram below is where the majority of a game experience should lie.

Each player has a different individual flow profile, however in this course, we'll only be looking at flow for the average player.



The flow diagrams below depict how increasing/decreasing a player's skill and/or the game difficulty affect the game experience for an average player.

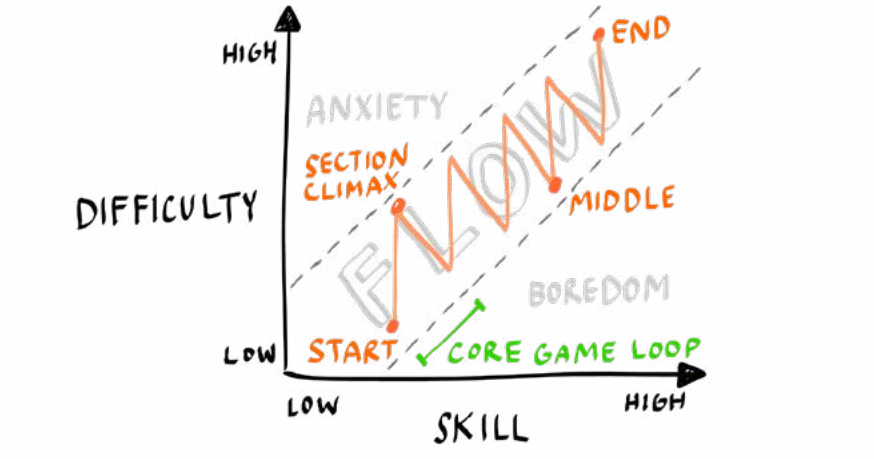
Poor Flow



The flow diagram above depicts a game where the player's skill increases, but the difficulty does not change. **The lines connecting start, middle, and end depict the changes in flow over time.**

Generally speaking, the player's skill increases over time as they gain mastery. This is represented in the diagram above by the player becoming bored throughout the middle and end of the experience.

Good Flow



The diagram above depicts an experience where the designer increases the game's difficulty at the same rate as the player's skill. Note that the curve is not linear. This is what a typical well designed flow experience looks like. There are a few interesting things to note on the following page:

- The start of a section usually begins on the lower part of the flowband to prevent players from being overwhelmed by difficulty. A section could be thought of as a core game loop (more information on core game loops in the next Teacher's Context).
- A designer typically increases difficulty until the section's climax (E.g., a boss counter/climactic event) after which the player is allowed to start relaxing and enjoying the new skills they learned. **This downtime is important to prevent player exhaustion.**
- Section climaxes provide moments of tension and triumph throughout the experience.
- As the player starts to get bored in this downswing of difficulty, the process will typically start afresh with a new challenge before they become bored. Note that the player's skill is constantly improving throughout the process.
- These ebbs and flows in intensity are pivotal to prevent the player from becoming bored or exhausted.

INFLUENCING FLOW

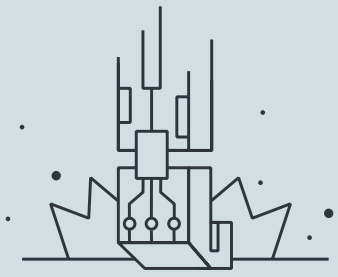
There are several factors that can cause a player to drift into the "boredom" category:

- Skill exceeds difficulty for prolonged periods of time.
- Too much downtime (E.g., having to wait for players to take their turn).
- Repetition of content without a meaningful difference between the experiences.

There are several factors that can cause a player to drift into the "anxiety" category:

- Difficulty exceeds skill for prolonged periods of time.
- Too much complexity (overwhelming game boards, lengthy rules manuals, overloaded user interfaces).
- No downtime, leading to prolonged periods in a stressful situation.
- Time pressure.
- Analysis paralysis (too many choices).
- Natural exhaustion (burnout, heightened intensity for too long).
    - Particularly if an experience fails to oscillate and encroaches on the anxiety border for a prolonged period of time.

A well designed game will ensure that either the player's opposition (other players or the game itself) are also improving when the player improves (E.g., a matchmaking algorithm) or that the game's inherent difficulty increases in tandem with the player's increase in mastery (especially in the case of a single player game).



20 MINUTES

Flow Discussion

Enduring Understanding

- Flow states are important to immerse players in the game experience and increase enjoyment.
- Many different factors affect flow in different ways.

FLOW EXPLANATION: 10 MINUTES

1. **Explain to the students about flow using information from the section above.** Should include:
   - Definition of flow.
   - Descriptions of the flow band, anxiety and boredom areas.
   - Examples of good and bad flow.

Essential Questions

Have you ever quit a game and why?

- Players quit games for several reasons, E.g.,
  - *Poor flow.*
  - *Disliking that game genre.*
  - *Friends are not playing.*
  - *I got bored.*
  - *It was too difficult.*
  - *It got repetitive.*
- Some of these reasons are expected tradeoffs for certain design decisions.
  - For example, a game that is not multiplayer will not be able to serve players that are looking for a “fellowship” type of fun experience.
- However, it is desirable to not have players quit your game for reasons that are easily avoidable, such as having poor flow.

Have you ever played a game for a long time and why?

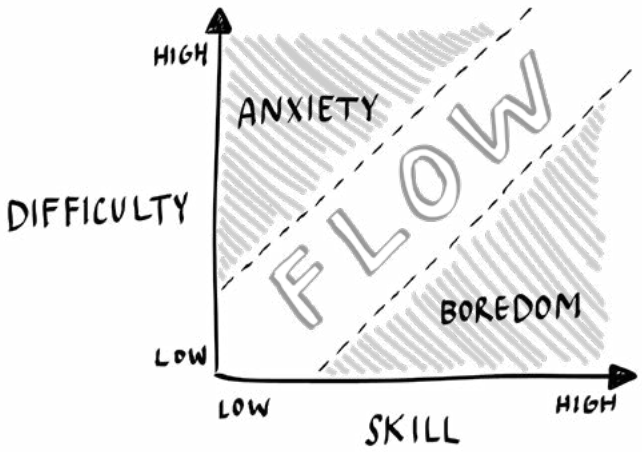
- Optimally, a designer wants to maximize a player’s enjoyment and engagement with a game.
- Can the students articulate what things the designer did to maximize enjoyment with the game?

  Good responses here include: matchmaking, allowing players to play with friends, moments of downtime that allow for long play sessions, having dynamic difficulty, or simply by having difficulty settings to account for players with different flow requirements.

Why is being in the flow important?

- To avoid boredom or anxiety.
- To match a player's expectation of the difficulty of an encounter.
- For example, it is anticlimactic for the boss of the level to be easy to defeat.
- A supplementary question to ask to get at the above point is "should a boss be easy or difficult and why?"

Have students sort each of the factors that will affect flow (on the whiteboard).



01 **Skill**
Increasing a player's skill will move a point to the right.

02 **Difficulty**
Increasing the difficulty will move a point up.

03 **Complexity (lists of rules)**
Increases in complexity move a point up (increases difficulty).

04 **Downtime (time between actions)**
As downtime increases, difficulty decreases (players can think) and so a point will move to the right.

05 **Time Pressure**
As time pressure increases, difficulty increases and so a point will move up.

Choices
06 As the number of choices increase, difficulty increases and so a point will move up.

Repetition
07 A repetitive game will push a point to the right.

Exhaustion
08 Exhaustion typically manifests when a player stays on the anxiety border for too long. It will push a point to the left.

What is the point of oscillating within the flow band? (The sawtooth shape in the last Teacher's Context image).

- Extended periods of time close to either the anxiety or boredom regions are likely to produce those effects, but short periods near the two boundaries can allow players to become re-engaged or relax respectively.
- This is important to maintain a player's engagement, especially in longer sessions.

Were you ever in the flow while playing Us vs It or the Goals Game? Why or why not?

- Tank decisions in this game are pretty solved on Playtest 2 (there is almost always an optimal play that is easy to calculate, or the robot will be too powerful, resulting in defeat regardless of the chosen player action).
- This will typically push players to the bottom right in the first case (boredom) or the top left in the second case (anxiety).
  - The game could be better balanced, so that tank decisions are not as easy.
  - The tank moveset could be reworked to provide less degrees of freedom. I.e., Turn, Move, and Shoot gives a lot of control to the tank player (partially due to Shoot having infinite range).
- Ultimately, even if Us vs It is well balanced, it starts to get boring. Why is this?
  - There aren't enough things to do (this is hinting at gameplay depth).
  - The game plays out roughly the same way each time (there is low variance between playthroughs).

This flow diagram is powerful for describing how skill and difficulty are related in single player games or new game experiences (typically of finite length). How can it be applied to multiplayer games? (Typically infinite length.)

- The core game loop of a multiplayer game will follow a similar pattern to the core game loop described in the previous section.

  I.e., In basketball, one possession is the core game loop.

  - Within a possession, the game's difficulty starts low (you're taking the ball to the opponent's territory) and as the shot clock approaches 0, the difficulty increases until the ball leaves play and everyone relaxes again.
- Constructing a fair match with equal opposition (matchmaking) is the core contributor to maintaining flow in multiplayer games.
  - No matter how well the game of basketball is designed, without an opposing team being equal in skill, players are not going to be in a state of flow.

What changes could be made to improve the flow state of the players in Us vs It?

- Executing the robot's sequence, followed by taking 3 tank turns takes a long time, which is likely to cause players to disengage while the robot is moving or other players are taking their turn.
  - The core game loop could be shortened by decreasing the robot's Action Order from 10 to 5 or by decreasing the tank's moves per turn from 3 to 2.
  - The designer could implement a turn timer to prevent a player from spending a minute to calculate their turn.
  - Learning the game takes a long time due to its complexity.
  - We could reduce the complexity by reducing the available moves for the robot or by having less complex moves.

Teacher's Context: Core Game Loop

5 MINUTE READ

The core game loop is the repeated set of actions that a player engages in while engaging with the game.

For example, in *Super Mario Bros*, the core game loop is:

- Traverse through the level.
- Hit blocks.
- Collect items.
- Defeat enemies.
- Reach the flag to get to the next level.
- Repeat.

At the next level (of abstraction) up, the core game loop would look something like:

- Complete level.
- Complete level.
- Complete level.
- Defeat boss.

Explicitly designing a game's core loop allows the designer to deliberately space out and structure their subgoals and goals, difficulty and pacing choices. These directly contribute to the player's state of flow (described above).

Abstracting further, a designer can examine their game's "loops" on a moment to moment, game to game, session to session, month to month basis and ensure they're constructing each of those experiences in a satisfying manner.

SATISFACTION

An important reason to design a core game loop is to **build positive expectations** from the player for a game experience; either consciously or subconsciously. Decisively and ceremoniously meeting this expectation results in satisfaction for a player, E.g., defeating a boss/player and receiving a reward or leveling up.

In video games, defeating bosses, opening reward chests, or completing levels are often met with ceremony (audio and visual) that provides a positive sensory response. Paper games often give tangible rewards, such as cards that are upgrades to your character, collectible currency pieces, etc.

Without having the player play through a core game loop structure (E.g., building up anticipation for a boss encounter), it may be difficult to have the player build up anticipation for this high satisfaction event, due to lack of consistency. An example of this would be if a player randomly found epic quality loot just lying around while they're walking, which is likely to be anti-climactic.

15 MINUTES

Core Game Loop Discussion

Enduring Understanding

- Designing a "core game loop" allows players to progress, gain mastery, and increases immersion.

Essential Questions

What is the point of defining a "core game loop" structure?

- WWe're able to ensure that the game is delivering adequately on putting players in a state of flow.
- This is accomplished through auditing the game's difficulty, its pacing choices, whether subgoals and goals are spaced correctly, whether the time to accomplish each subgoal and goal is appropriate, and whether each subgoal and goal is delivering on a satisfying player experience.
- By having a consistent structure that repeats (with different content), players can have better expectations for what the game experience is going to deliver, which can aid a player's feeling of improvement and satisfaction.

  For example, if the player has the expectation that there is a boss at the end of an act (that is appropriately difficult to defeat), they're much more likely to feel like there are clear moments of completion and success, compared to if there is sometimes a boss and sometimes there is not, or if the boss is occasionally trivially easy.

Can you describe the core game loop structure for both Us vs It and the Goals Game?

Us vs It

- Conduct robot sequence.
- Conduct each tank turn.

Goals Game

- Play a card until a winner is decided.
- Winner collects that card.

What about core game loops for other games?

- In football, the core game loop is 4 downs that repeat per team possession. *Each down would also be considered part of this core game loop.*
- **In classic *Mario* games, the core game loop is:**
  - Traverse through the level.
  - Hit blocks.
  - Collect items.
  - Defeat enemies.
  - Reach the flag to get to the next level.
  - Repeat.
- **At the next level (of abstraction) up, the core game loop would look something like:**
  - Complete level.
  - Complete level.
  - Complete level.
  - Defeat boss.

What are the core components of satisfaction with regards to the core game loop?

- Anticipation of a positive experience can allow the designer to deliver the ultimate "high moment," which is very satisfying for a player.
- Satisfying moments should be delivered decisively so there is no confusion from the player about what happened.
- For example, if a player kills the boss but they're unsure whether the boss is actually dead, that could greatly undermine the satisfaction of the moment.
- Contrast this to killing the boss, leveling up, and ceremoniously dropping its loot by playing a visual effect coupled with a triumphant sound.
- This would make the player feel awesome.
- Mention the core components of satisfaction in ceremony:
  - Visual, auditory, tangible reward (E.g., loot, gear, leveling up), anticipation.

How would you know if your "core game loop" is well designed?

- There is no set formula for this, but understanding the motivations, expectations, and preferred types of fun of the target audiences (from Module 1) are important.
- For example, in games that index heavily on instant gratification, having players spend too long in the anxiety zone (high difficulty) may not be a good match. These players are typically not looking for a challenging experience.
- Similarly, having these players wade through lots of complex rules or long core game loops are also likely to bounce them off the game.
- Conversely, if your players are very engaged and experienced game players, they may tolerate a longer, more complex, and more difficult core game loop.
- Having this type of player spend a long period of time trying to defeat a boss may be more appropriate.
- Ultimately, it comes down to the audience the game experience is trying to serve.

Homework

Game Design Framework Worksheet

1. Students are to fill out what they learned from the Opposition portion and important takeaways (at least 3).
    - The focus should be on how these learnings apply to games generally or to the game they will create in the final module.
    - The responses should be open ended.

Completed Five Whys Evaluation

1. Students should add at least one Five Whys evaluation to their journal.