



Ethan Alward

ID: 3695438

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Concept Assignment #2

CS2053 Introduction to Game Development

1. What is the difference between polling and event-based models of handling input (think of the steps in code that you would have to follow if you were implementing these models yourself)?

Polling is when you check for a specific value as input every frame. Event-based would only calculate input when an input event has occurred, this would be like binding a key to a function. Polling would be checking if `Input.just_pressed("ui_left")` everytime the process function runs, but event based would just bind that keystroke to a function like `func leftPressed():`.

2. The 4 values of "KeyState" defined in the textbook depend on both the state of the keyboard in the last frame and the current frame. Describe a situation in game programming which definitely needs to use this 4-value key state, and a situation in game programming which only needs to depend on the current state of the keyboard. Also, for each of the following key states, give an example game action which needs to be triggered by that key state.

- StillReleased
- JustPressed
- JustReleased
- StillPressed

The first situation in game programming that relies on this 4-value key state that came to mind was Call of Duty. The shooting mechanism needs all 4-value key states, or a bullet would be fired every frame. Conversely in Call of Duty your movement is really only dependent on the current state of keyboard input.

Shooting game where 1 bullet is fired per trigger button press:

- StillReleased: Load a bullet in the chamber
- JustPressed: Fire a bullet
- JustReleased: set `canFire = true`
- StillPressed: set `canFire = false`

Note: this reminds me of software debouncing, we've done this before in electrical eng courses.

3. In a first-person 3D game, why do we always set the sound listener's position to be the same as the camera? In third-person 3D games, what are advantages and problems when we set the sound listener's position in the same location as the player object? Describe a situation in a third-person 3D game that, when the sound listener's position is not properly set, the player object may hear a sound from the left, but the camera may view the sound emitter on the right (i.e., hear the sound from the right).

In a first-person game, the camera acts as our eyes. It would make sense for the camera to essentially be our head, and thus why we'd want sound to be interpreted through that position. In third-person games where the camera is not in the same position as the player so it would make sense for the sound to come from the player's perspective. An advantage of this would be that sounds directly in front of the player are louder than they would be if the camera was interpreting the sound. If the sound interpreter is set 10 meters to the right of the player, and a sound is emitted from 5 meters to the right of the player, the sound interpreter will think it is coming from 5 meters to the left and will then project that incorrect sound into the user's headphones.

4. For each of the following DSP (Digital Signal Processing) effects, describe a game, which you played, you know, or you can imagine, that uses such an effect.

- Reverb
- Pitch shift
- Compressor
- Low-pass filter

Reverb: In Forza the revving of engines echo when you're in a tunnel compared to an open road.

Pitch shift: In Super Mario, when he eats a small mushroom his voice is pitched much higher than when he is standard or large size.

Compressor: In Fortnite you can hear footsteps even when you're shooting a gun. They must compress these sounds to achieve that.

Low-pass filter: This is a tough one but I think a good example would be when you're underwater. A low-pass filter could be used so that only muffled deep sounds are heard.

5. Explain the difference between play mechanics, core mechanics, and local emergent gameplay. Give an example of each one.

Core mechanics are actions that users will perform repeatedly throughout the game, ones that the developers likely worked on the most. An example of this would be shooting or building in Fortnite.

Play mechanics are actions that are not used as frequently but are still part of the game, ones developers designed and foresaw. An example of this would be swimming in Fortnite, since the map is 95% land this action is less likely to occur.

Local emergent gameplay is an action that a user may have stumbled upon by using the game in a way developers didn't see coming. An example of this would be rocket jumping in Fortnite, your teammate shoots a rocket at your feet and you jump in time to land on the rocket.

6. Define and briefly explain the four parts of the Elemental Tetrad.

The elemental tetrad encompasses the four main parts of a game: Aesthetics, Mechanics, Story, and Technology. Aesthetics is how the game looks, sounds, and feels. The better the graphics or soundtrack the more users will want to play. Mechanics are the rules of the game, how players interact/play. Technology is the equipment that makes the game work, whether that's a console, or a pack of cards. Finally the story of the game is the premise, the point, and or the narrative. A game with a purpose is more captivating for users.

7. Give an example of a game genre where a large focus on story content would likely be well-received and one where it would likely be not well-received. Explain your reasoning.

Role playing games are the most story based so I'd say fans of this genre value a good plot to go along with their game. A genre where focus on story content would be relatively negatively received would be Shooting games. Most people who play Fortnite do not care about the story behind their character.

8. A story has 4 main components. Define each component of the story, and describe how your project's story will provide all 4 aspects.

The four components of a story are the Premise, Setting, Character, and Plot. The premise is a story's narrative basis. The premise for our game is a guy wants to go for a drink and play some cards with his friends but is stopped before doing so. The setting is where the story takes place, in our game the setting is the UNB Fredericton campus bar known as The Cellar. Characters are

the people featured in the story. The main character in our game is unnamed yet but they're the person who must win at some card games. The plot is the sequence of events that occurs during a story. Our game's plot is a guy goes to the bar to meet his friends and play some card games but before he's allowed to get a drink and sit down he has to beat a few enemies at different card games.

9. In class, we discussed the concept of Flow. Briefly describe what flow is, and two side effects of being in a state of flow. Describe an example of how a game can attempt to provide flow to people of a wide range of skill levels.

Flow is a state of consciousness where you are moving your body instinctively with complete focus. When you are in flow state there are no distractions. The first side effect of flow state is that you lose track of time, when you are solely focused on the task at hand hours can pass and it feels like only minutes have. A second side effect of flow is a loss of self-consciousness, gamers in flow state often forget to correct their posture. Mario Kart attempts to provide flow to a wide range of skill levels by increasing the reward of those special ? boxes to the players at the back of the field. This creates more competition and motivates users to keep trying when they're far behind.