UNIVERSITY OF Baguio

SCHOOL OF INFORMATION TECHNOLOGY

GAMDEV1

GAME DEVELOPMENT - LECTURE

A Self-regulated Learning Module

Prepared by:

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UNIVERSITY OF Baguio

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Course Overview

Course Code: GAMDEV1

Course Description: Game Development 1

This course introduces students to effective and structures procedures used to design and develop game software.

Learning Competencies:

At end of the course, you are expected to

First Grading:

1. Identify significant milestones in the history of electronic game development.
2. Identify and describe the different platforms that are available for game development, and what specific elements are associated with each platform.
3. Explain how player modes affect how games are designed or developed.
4. Identify and describe the different time interval options, and how do they change the way a game is played.

Midterms:

Finals:

Module Requirements:

At the end of each module, you are expected to complete each:

1. Self-check (Quiz)
2. Assignments
3. Case Study
4. Recitation

*** All module quizzes and other activities shall be placed in a long brown envelope and submitted at the end of each module.

Contact Information:

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https://www.facebook.com/krejpinoy

Consultation Hours:

Course schedule

Course Policies:

- This is an online course. Students' participation in class discussion is very important. A student who does not participate in a class must inform the instructor immediately with an explanation.
- No makeup homework/lab/quiz/exam will be given. No extra credit work will be given.
- All class activities are done online through CANVAS, including submissions of homework and lab assignments.

- Late submissions will lose 10% of total score per day up to two calendar days. No submission will be accepted two calendar days after the due date. Talk to instructor for special cases, such as illness. Proper documents, such as a doctor's note, may be required as a proof.
- All course work must be individually done. Any forms of cheating may cause penalties, from getting a ZERO in the course to academic actions according to the University's policy. The policy is available on Student's handbook.

LESSON 1: Game Development Foundations

Duration: 1.5 hours

At the end of this lesson you are expected to:

1. Identify significant milestones in the history of electronic game development.
2. Identify and describe the different platforms that are available for game development, and what specific elements are associated with each platform.

1.1. What is a 'Video Game'?

- "a game played by electronically manipulating images produced by a computer program on a television screen or other display screen" (Oxford University Press (OUP), n.d.).

1.2. History of Video Games

1.2.1. William Higinbotham (1958) – *Tennis for two*

- Meant to entertain the Brookhaven National Laboratory visitors
- Was assemble in three weeks with the technical assistance of Robert V. Dvorak, who wired up the patch work
- Used an analog computer hooked up to an oscilloscope

Modern recreation of the controller
by *Windell Oskay*

1.2.2. Steve Russel (1961) - *Spacewar*

- Created a two-player game in 1961.
- The game was designed for each player to maneuver his spaceship while trying to shoot the other player's spaceship with torpedoes.
- Became a public domain program and quickly spread to other colleges over ARPAnet, an early version of the Internet.

Spacewar! On the Computer History Museum
by Kenneth Lu

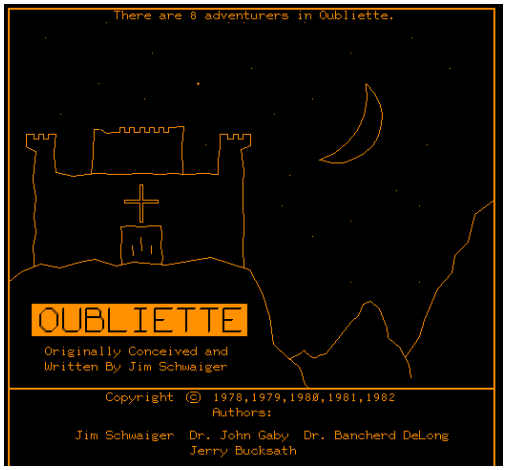
1.2.3. Rusty Rutherford (1975) – *pedit5 (aka The Dungeon)*

- The first PLATO (Programmed Logic for Automated Teaching Operations) single player game inspired by Dungeons and Dragons.
- Involved navigating a maze-like dungeon space of 40-50 rooms, with randomly generated locations that housed monsters and treasures.
- The goal is to accumulate 20,000 experience points which is gained through combat with monsters and collecting treasure.

pedit5 gameplay
Image source: wikipedia

1.2.4. Jim Schwaiger, John Gaby and Bancherd DeLong (1977) – *Oubliette*

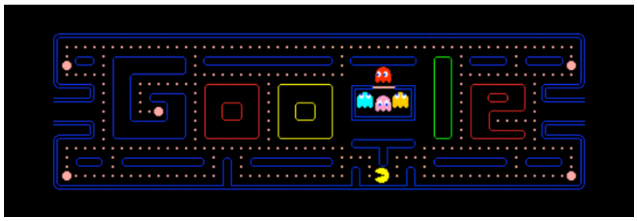
- First multi-player role playing game that allowed users to choose from 15 character rac3es and 15 classes depending on ability scores.
- It provided one of the earliest monetized strategies for multiplayer online games in which they had to "pay" for the game space and the players need to pay $3 per year if they wanted to keep their characters through the regular system purges. Other monetary exchanges in Oubliette centered on an underground economy in which players sold high-level characters and rare in-game magic items for real money in amounts in excess of $100.



Oubliette homescreen
by: Chester Bolingbroke

1.2.5. Toru Iwatani (1980) – Pacman

- Namco released Pacman in 1980, which was developed in 18 months.
- Sold over 300,00 units worldwide making it the most popular arcade game of all time



1.3. Games and Society: Who plays games?

- APAC (Asia-Pacific) continues to hold the majority share of the video game industry revenue, accounting for 48% of the market in 2020, with North America holding second place with a much lower share of 19%. In terms of individual countries, China is leading the way, followed closely by the USA. Japan comes in at a respectable third place, and then numbers drop dramatically as South Korea, Germany, and the UK follow up. (WePC, 2020)
- The chart on the left is ESA's (Entertainment Software Association) 2020 annual report that shows the age breakdown of video game players in the US.
    - The average gamer is 35-44 years old
    - 64% of gamers are 18 years old or older
- The same survey answers the question 'Why?', as seen in the next infographic

    - The vast majority of players say video games provide mental stimulation (80 percent) and relaxation (79 percent). Video games help to connect us, and 65 percent of players say they play with others online or in person. (Entertainment Software Association, 2020)

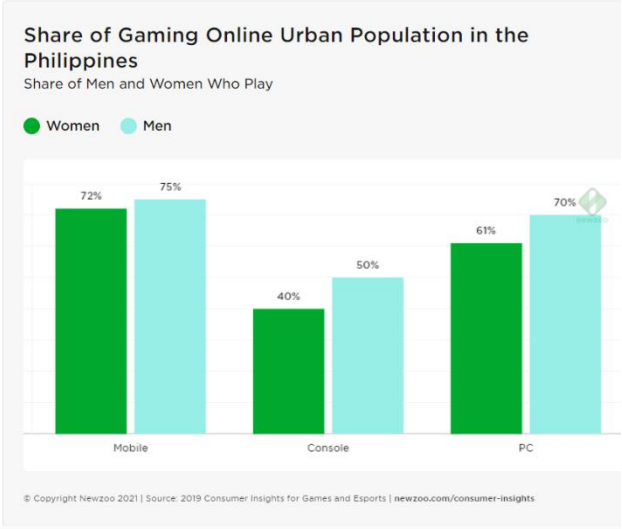
1.4. Game use:

- Training
- Education
- Scientific visualization
- Advertising
- entertainment

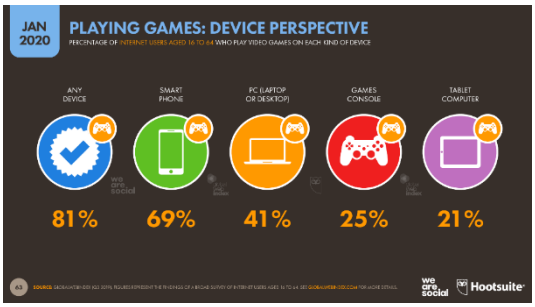
1.5. Game Elements: Platform, Time Interval and Player Modes

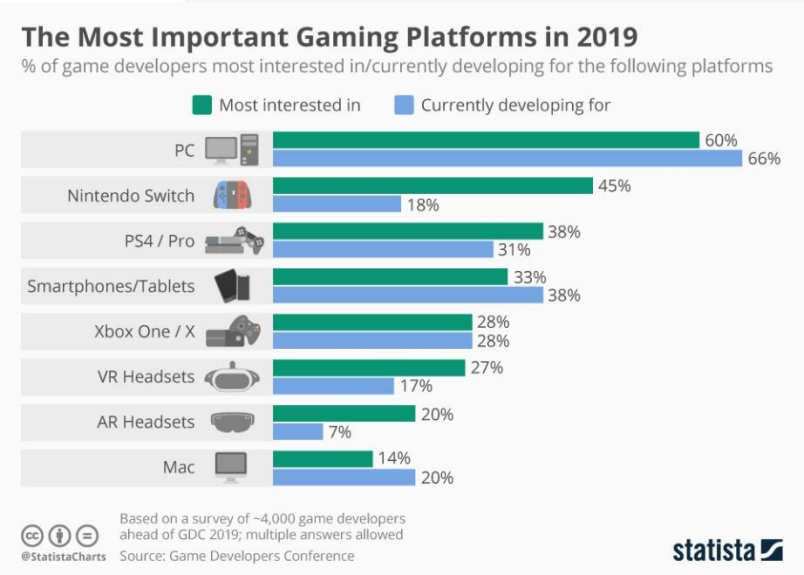
Game Platforms

- Refers to the computer technology or hardware system specially made for playing video games; also referred to, sometimes, console
- Since each game platform has distinct characteristics, games developed for each platform differ in several important respects.
- The chart on the left shows a 2019 survey in the Philippines on men and women's gaming platform preference. It shows that the majority of men and women in the urban online population play games on mobile and PC. However, only 40% of women play games on console (vs. half of men).
- The Game Developers Conference (2019), on the other hand, shows the 2019 gaming platforms that most game developers are most interested in/or are currently developing for.



Source: 2019 Consumer Insights for Gamers and E-sports





1. Arcade
   - Standalone game systems found in public venues –such as video arcades, bowling alleys, amusement parks, and pizza parlors.
   - Most games are played standing up with player controls consisting of buttons, joysticks, or combination.
   - Introduced in the mid-1980s and became popular items in diners and hotel lobbies.
   - There are three main entities associated with arcade game development:
     - Hardware manufacturer – owns the rights to the hardware and has control over what content is played on it
     - Game (or content) developer – often develops the game for the manufacturer, but is sometimes the same company the manufacturer

Arcade machines
Image source: wikimedia

- Venue operator – licenses or purchases the game from the manufacturer and collects revenue from the players.

2. Console
   - Usually played in the home, hooked up to a television set.
   - The system may support up to 4 controllers.
   - There are three major proprietary console systems on the market vying for audience attention: Microsoft's Xbox, Sony's Playstation, and Nintento
3. Personal Computer
   - Not proprietary
   - The development team needs to create prospective technical specifications for the game and try to develop the game around such specifications.
   - Both minimum and recommended technical specifications should be available to the player.
   - Minimum specs are those necessary for the player to load and play the game from the beginning to end (e.g. processing speed, memory, disk space), while recommended specs expand further on the minimum specs for an enhanced game-playing experience.

Alienware Arena
Image source: alienwarearena.com

4. Online
   - Online games are played on a computer platform or through a console system but connected to the internet, but the technology behind the online games differs greatly from the games on other platforms.
   - Players need an Internet connection to play, and game information might be stored on a server.
   - The largest online games involve thousands of simultaneous players, which sometimes requires that the information for the game be stored on several servers.
   - Massively multiplayer online games (MMOs) entertain thousands (even millions) of players simultaneously over the internet, 24/7 and are ongoing *persistent worlds (e.g.* Minecraft, Shenmue, CryoFall) –which pose very unique development and maintenance problems.
5. Handheld
   - Small handheld portable devices that can be taken almost anywhere.
   - A multipurpose device that allows users to watch movies and play games.
   - It has a multitude of features like build in controllers or analog sticks, a multi-touch screen, Bluetooth, Wi-Fi, 3G/4G support, a camera, an accelerometer, gyroscopes, other features.
6. Mobile
   - Mobile phones were introduced at the end of the 20th century containing puzzle or trivia games.
   - Nokia was well associated with the Snake game.
   - Nokia's effort inspired other manufacturers to consider the possibilities of the mobile gaming market and has been undergoing rapid change since 2007, when developers and publishers began to recognize that the " always on/always connected" mature of the mobile platform.
7. Tabletop
   - Refers to the traditional analog game platform.
   - It includes board, card, tile, block, and even pen-and-paper games

LESSON 2: Game Designer Skills

Duration: .5 hours

At the end of this lesson, you are expected to:

1. Identify skills and knowledge of game designer and developer teams

2.1 Useful Skills in Game Design and Development

1. Animation: Modern games are full of characters that need to seem alive. The very word "animation" means "to give life."
2. Anthropology: You will be studying your audience in their natural habitat, trying to figure out their heart's desire, so that your games might satisfy that desire.
3. Architecture: You will be designing more than buildings; you'll be designing whole cities and worlds. Familiarity with the world of architecture, that is, understanding the relationship between people and spaces, will give you a tremendous leg up in creating game worlds.
4. Brainstorming: You will need to create new ideas by the dozens, nay, by the hundreds.
5. Business: The game industry is just that, an industry. Most games are made to make money. The better you understand the business end of things, the better chance you have of making the game of your dreams.
6. Cinematography: Many games will have movies in them. Almost all modern videogames have a virtual camera. You need to understand the art of cinematography if you want to deliver an emotionally compelling experience.
7. Communication: You will need to talk with people in every discipline listed here, and even more. You will need to resolve disputes, solve problems of miscommunication, and learn the truth about how your teammates, your client, and your audience really feel about your game.
8. Creative writing: You will be creating entire fictional worlds and populations to live in them and deciding the events that will happen there.
9. Economics: Many modern games feature complex economies of game resources. An understanding of the rules of economics can be surprisingly helpful.
10. Engineering: Modern videogames involve some of the most complex engineering in the world today, with some titles counting their lines of code in the millions. New technical innovations make new kinds of gameplay possible. Innovative game designers must understand both the limits and the powers that each technology brings.
11. Games: Naturally, familiarity with games will be of great use to you, but not just familiarity with the kind of games you intend to create. Your knowledge of the workings of every kind of game from pin the tail on the donkey to Portal 2 will give you the raw materials you need when you create new games.
12. History: Many games are placed in historical settings. Even the ones placed in fantasy settings can draw incredible inspiration from history.
13. Management: Anytime a team works together toward a goal, there must be some management. Good designers can succeed even when management is bad, secretly "managing from below" to get the job done.

14. Mathematics: Games are full of mathematics, probability, risk analyses, and complex scoring systems, not to mention the mathematics that stands behind computer graphics and computer science in general. A skilled designer must not be afraid to delve into math from time to time.
15. Music: Music is the language of the soul. If your games are going to truly touch people, to immerse, and embrace them, they cannot do it without music.
16. Psychology: Your goal is to make a human being happy. You must understand the workings of the human mind or you are designing in the dark.
17. Public speaking: You will frequently need to present your ideas to a group. Sometimes you will speak to solicit their feedback; sometimes you will speak to persuade them of the genius of your new idea. Whatever the reason, you must be confident, clear, natural, and interesting, or people will be suspicious that you don't know what you are doing.
18. Sound design: Sound is what truly convinces the mind that it is in a place; in other words, "hearing is believing."
19. Technical writing: You need to create documents that clearly describe your complex designs without leaving any holes or gaps.
20. Visual arts: Your games will be full of graphic elements. You must be fluent in the language of graphic design and know how to use it to create the feeling you want your game to have.

LESSON 3: Creating the Game Experience

Duration: .5 hours

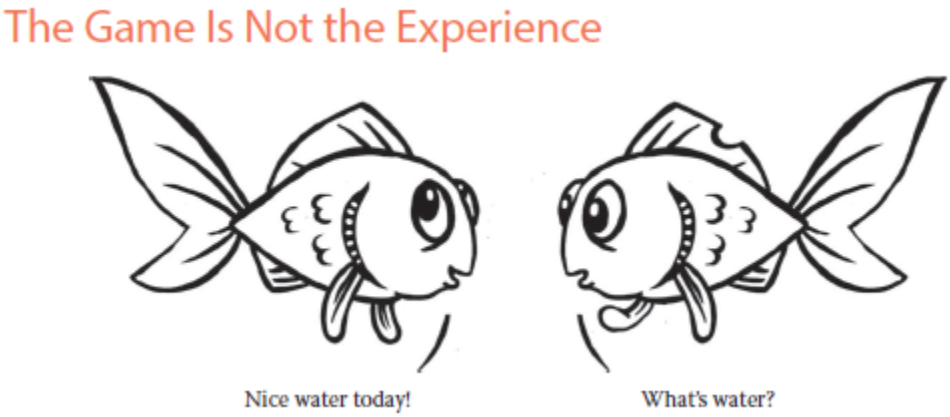
At the end of this lesson, you are expected to:

1. Identify game designer goals;
2. Identify and understand different approaches to creating a game experience;

This lesson will discuss what and how the skills from the previous lesson is used in game design. This is the game designer goal. When people play games, they have an experience. It is this experience that the designer should care about. Without the experience, the game is worthless.

3.1 The Game Experience

The game is not the experience. The game enables the experience, but it is not the experience.



The player and the game are real. The experience is imaginary—but game designers are judged by the quality of this imaginary thing because it is the reason people play games (Schell, 2019).

I. Approaches

A. Psychology – to learn the nature of human experience from than psychologists, the scientists who study the mechanisms that govern the human mind.

> It provides approaches we can use quite effectively. Not bound by the strict responsibilities of good science, game designers can make use of both behaviouristic experiments and phenomenological introspection to learn what we need to know, since ultimately, as designers, we are not concerned with what is definitely true in the world of objective reality but only with what seems to be true in the world of subjective experience.

B. Anthropology – It takes a much more holistic approach than psychology, looking at everything about people including their physical, mental, and cultural aspects. It is very concerned with studying the similarities and differences between the various peoples of the world, not just today, but throughout history.

C. Design - The incredible variety of design "rules of thumb" that comes from these different disciplines does an excellent job of illustrating useful principles about human experience.

II. Motivation

A better understanding of what motivates people to play games can help you develop and design games that will satisfy and meet their needs and expectations. By considering your audience, you will get more people to play you game and keep them entertained and/or interested. The following are a few factors that motivate players to start and/or keep playing games:

1. Social Interaction
    - This can be a motivation factor for some players who might be motivated to interact socially with their opponents or team members.
    - They are often allowed to communicate through the game itself –often discussing non-game related topics rather than "staying in character."
2. Physical Seclusion
    - Common in single-player puzzle games.
    - Players who want to be secluded are still interacting socially –but in the privacy of their own physical environments.
3. Competition
    - Players who enjoy the thrill of competing with other players.
4. Knowledge
    - Players who are motivated to gain more knowledge of particular concepts, processes, and strategies by playing games.
5. Mastery
    - Players who are motivated to play in order to master the game itself and demonstrate their ability to dominate the game world and figure out how to become advance players.
    - This can be seen when players are seen building their character skills to "win", or attaining high scores and rankings
6. Escapism
    - Players play to escape from ongoing stresses and challenges of real life.
    - An imaginary world can become so immersive with its own rules which are less restrictive than those in real life.
7. Addiction
    - The tendency to focus one activity at the expense of all others

- Because games offer players the opportunity to take active roles in the entertainment experience-including making decisi9ons and getting feedback, which, they don't normally get in the real world.

8. Other

- Therapy – a chance to work through some troubling issues
- exercise

III. Goals and Genres

Goals

- Games are developed for a variety of purposes, whether to entertain, educate, support market, or build a social community.
    1. Entertainment
    2. Social
    3. Educational

Genre

- Types of games are defined and categorized as genres.
- A game genre provides an outline of a specific game as far as how the game might look as well as the essential game-playing elements. Game genres are important to us as developers as they assist us in defining game types but also help us to communicate basic game features to help streamline some components of the design process. (Miles, 2016, pp. 10)

1. *Adventure* - Characteristics of adventure games include exploration, collecting, puzzle-solving, navigating mazes, and decoding messages. Unlike action games, adventure games are usually turn-based—allowing the player time for reflective thought. This key difference in the way the game is played is most likely the primary reason adventure gamers are not into action-adventures. *(Novak, 2011, pp. 72)*

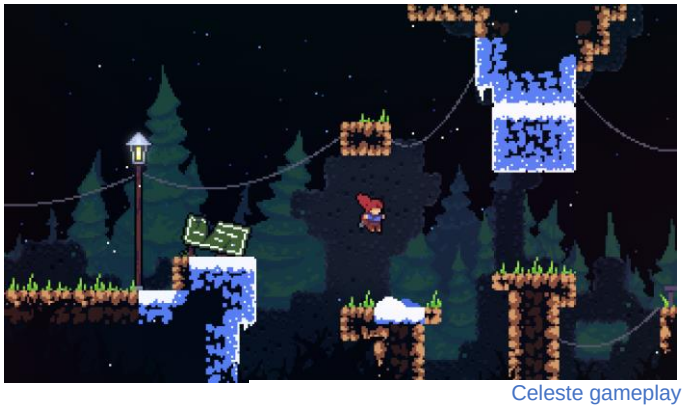
Examples

The Book of Unwritten Tales: The Critter Chronicles, Tacoma Adventure (or Colossal Cave) , Ico & Shadow of the Colossus Collection, Necrobarista, What Remains of Edith Finch

The Book of Unwritten Tales gameplay
Image source: MacGameStore

1. *Action -* The action genre of games is almost a catchall in that it contains so many games that could almost fit into other categories.
   A. *Platformer -* Traditional and classic arcade games from the golden era of the arcade are members of the platform genre. These games include such classics as Pac-Man and Donkey Kong. *(Miles, 2016, pp. 12)*
      - The platformer action sub-genre focuses on players moving quickly through an environment—often jumping and dodging to avoid obstacles, and sometimes collecting items along the way. (Novak, 2011, pp. 70)

      Examples
      Donkey Kong, Sonic the Hedgehog, PacMan, Ratchet and Clank, Super Mario, Alto's Odyssey, Kirby, Celeste


Celeste gameplay
Image source: https://www.videogamer.com/

   B. *Shooter -* The shooter action sub-genre focuses on combat between a player and the other characters in the game world—usually in the form of shooting with guns and other weapons controlled by the character's hands.
      - First-person shooter (FPS), where the player has a first person perspective and cannot see his or her character onscreen but can see his/her character's weapon, as well as the other characters in the game.
      - Third-person shooter allow the players to see their characters, along the rest of the game world. It has a wider perspective than in FPS.

      Examples
      Call of Duty (FPS), Gears of War (Third Person), Counter-Strike, Halo, Doom, Overwatch


Call of Duty gameplay
Image source: https://www.pcmag.com/

   C. *Racing -* Games in the racing sub-genre also use first-person or third-person perspective. The standard scenario involves the player's vehicle (usually a racecar) racing one or more opponents on a variety of roads or terrains.

      Examples
      Burnout 3: Takedown, Gran Turismo 3, Forza Horizon 3, Mario Kart8, Daytona USA Driver: San Francisco, Street Rod, TOCA Race Driver 3

TOCA Race Driver 3 (2006) gameplay
Image source: https://www.ign.com/

D. *Fighting -* Many fighting games are two-person games in which each player controls a figure on screen and uses a combination of moves to attack the opponent and to defend against the opponent's attacks. These games are often viewed from a side perspective, and each session lasts only an average of 90 seconds.

Examples

UFC 2009 Undisputed, Ultra Street Fighter IV, Ultimate Marvel vs Capcom 3

Ultra Street Fighter IV gameplay
Image source: https://www.pcmag.com/

2. *Strategy -* the central feature of a strategy game is the player's ability to process data and information in order to determine the best potential way to beat opponents.
   - Strategy games can be played against artificial intelligence (AI) opponents or against other human players or can be played in teams (against other teams of humans or computer-controlled teams).
   - Strategy games require resource management as there are limited quantities of resources within games that must be utilized for the construction of other game units needed to become more powerful or in some other way expand your side's advantage over the other side.

A. *Turn-Based Strategy (TBS) -* In turn-based strategy (TBS) games, resource management involves discrete decisions such as what types of resources to create, when to deploy them, and how to use them to the best advantage.

Examples

Sid Meier's Civilization V, A Game of Thrones, Gears Tactics, Panzer Corps 2, Unity of Command 2, Battletech

Image source: https://www.pcgamesn.com/

B. *Real-time Strategy -* Real-time strategy (RTS) games incorporate a real-time interval. RTS players are under such constant time pressure that they don't have the opportunity to truly ponder a move.

Examples

Halo Wars, Company of Heroes 2: Ardennes Assault, Command & Conquer: Red Alert 2

Company of Heroes 2: Ardennes Assault gameplay
Image source: https://www.pcgamesn.com/

3. *Simulation -* Simulations (sometimes referred to as sims) attempt to replicate systems, machines, and experiences using real-world rules.

A. *Vehicle Simulations –* the player usually operates complicated machinery (often vehicles such as jet fighters, ships, or tanks)

Examples
Microsoft Flight Simulator

B. *Sports & Participatory –* engage the player to experience the simulation as a participant within it. The sports genre is a type of participatory sim.

Examples
Project Rockstar

C. *Process Simulations (Construction & Management) –* involve rea-world systems or processes

Examples
Rollercoaster Tycoon, Sim City, Cities: Skylines

Cities: Skylines gameplay
Image source: https://www.epicgames.com/

4. *Puzzle –* focuses on the player solving a puzzle or series of puzzles without controlling a character. Puzzle games revolve around requiring the player to find a solution to a specific puzzle before them.

Examples
Bejeweled, Candy Crush, Hidden Object games, Opus Magnum

Opus Magnum gameplay
Image source: https://www.digitaltrends.com/

5. *Massively Multiplayer Online (MMO) -* The game play itself is generally of the action–adventure game style combined with the role-playing style along with the added benefit of being able to play the game with small or large groups of other players, including playing against those players.
    A. *MMORPG - Massively Multiplayer Online Role-Playing Games* (Tera, Elder Scrolls Online, Eve Online, Skyforge, Guild Wars)
    B. *MMOFPG - Massively Multiplayer Online First-Person Shooter Game* (Call of Duty: Warzone, Pandemic Express -Zombie Express, Destiny 2, Counter-Strike: Global Offensive)
    C. *MMORTS - Massively Multiplayer Online Real-Time Strategy Games* (Kingdom Underfire 2,

Skyforge gameplay
Image source: https://www.pcgamesn.com/

6. *Role-Playing (RPG) -* Role-playing games (RPGs) originate from the tradition of the Dungeons & Dragons paper-and-pencil fantasy role-playing games that originated in the 1970s. In these games, players take on roles such as fighters, wizards, priests, elves, or thieves. Players also explore dungeons, kill monsters (such as dragons and ogres), and gather treasure.
    Examples

Dragon Age, Final Fantasy, The Witcher, Genshin Impact

Genshin Impact gameplay
Image source: https://www.washingtonpost.com/

Reflection

To make sure the emotions you create are the right ones, ask yourself these questions:

1) What emotions would I like my player to experience? Why?
2) What emotions are players (including me) having when they play now? Why?
3) How can I bridge the gap between the emotions players are having and the emotions I'd like them to have?

References

Hussain, M. (2020, August 19). *Arcade Machines* [Photo]. Medium.Com. https://medium.com/super-jump/how-arcades-have-evolved-to-survive-4f4164ce8259

Kemp, S. (2020, January 30). *Filipino Gamers* [Infographic]. Https://Wearesocial.Com/. https://wearesocial.com/blog/2020/01/digital-2020-3-8-billion-people-use-social-media

Novak, J. (2011). *Game Development Essentials: An Introduction* (3rd ed.). Cengage Learning.

Online Gaming Statistics - 45 Facts That Will Blow You Away. (n.d.). BroadbandSearch.Net. Retrieved January 5, 2021, from https://www.broadbandsearch.net/blog/online-gaming-statistics#post-navigation-5

Oxford University Press (OUP). (n.d.). *video game*. Lexico.Com. Retrieved January 5, 2021, from https://www.lexico.com/definition/video_game

Rabin, S. (2010). *Introduction to Game Development* (Second Edition). Course Technology.

Schell, J. (2019). The Art of Game Design. Taylor & Francis.