

## UNIT – 1

### 3D GRAPHICS FOR GAME DESIGN

#### **Game Programming:**

Game programming refers to the code that brings a video or computer game to life.

Gaming programmers use programming languages, such as Adobe ActionScript, C++ and Java, to create graphics, sound, artificial intelligence and tools in video games.

To create artificial intelligence, you could write code to make computer-controlled characters more realistic in terms of expression, reaction and communication.

If you'd rather work in graphics or sound programming, you could work to perfect the playback of music, audio effects or animation.

It is the software development of video games.

#### **3-Dimensional: (3D)**

3D is a three dimensional with three spatial dimensions of width, height and depth.

Example: The physical world and everything that is observed in it are three dimensional.

The Three-dimensional transformations are extensions of two-dimensional transformation.

In 2D two Coordinates i.e. X and Y are used where as in 3D three coordinates X, Y, Z are used.

#### **3D GRAPHICS:**

3D Graphics technics and their application are fundamentals to entertainment, games and computer- aided design industries.

In 3D graphics, objects are created on a 3-dimensional stage, where the current view is derived from the camera angle and light sources, similar to the real world.

#### **GAME DESIGN:**

It is the process of creating and shaping the mechanics, systems and rules of a game.

Game design canvas is a tool that can be used to analyze and formulate games and their development.

The main basic things to design a game are:

- Platform
- Gameplay

- Levels
- Audience
- Hero
- Enemies
- Scoring
- Story
- Extras

## The Game Design Canvas

GAME NAME: \_\_\_\_\_



<b>PLATFORM</b> <i>What OS and devices are supported at launch? Do you have a release date in mind?</i>	<b>GAMEPLAY</b> <i>What are the rules, time constraints, or other factors that act on the players input? How do players win? What makes the goals hard? What provides variation, how do you avoid being repetitive?</i>	<b>LEVELS</b> <i>Rewards vs punishment</i>	<b>AUDIENCE</b> <i>What are the sales channels that will be used to reach target players/users? Is there a pre-existing community of interest?</i>	<b>STORY</b> <i>What's the concept or story? What is the setting, where does it take place? Short summary of the story.</i>
<b>HERO</b> <i>What's your hero's abilities?</i>	<b>ENEMIES</b> <i>Describe the type of enemies the player will encounter. Are there bosses? What are their abilities? How can the player defeat them?</i>		<b>SCORING</b> <i>Describe the type of enemies the player will encounter. Are there bosses? What are their abilities? How can the player defeat them?</i>	
<b>EXTRAS</b> <i>Why are you developing this game? Are there any learning or business objectives driving this project?</i>				

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### Genres of Games:

A video game genre is a specific category of games related by similar gameplay characteristics. Video game genres are not usually defined by the setting or story of the game or its medium of play, but by the way the player interacts with the game. In the other term it is said as, all the games which we develop come under one of the various predefined categories, these categories are also called **Genre of Game**.

Before developing a game, the game engineer or project leader has to decide what type of game he wants to develop for his audience.

Genre of a game defines the exact category of the game and can be relayed through the similar gameplay characteristics, like - the type of objectives and storyline, the levels and camera point (i.e. **FPS**, **TPS**), the features and the storyline that the game is showcasing. Genre of a game is not defined by the content or the playing mode, but by the common challenges and characteristics, that the game is having.

EXAMPLE:

**FIFA** and **PES - Pro Evolution Soccer** have similar properties and objectives as both of them are soccer games and the player's get points or the levels of difficulty raises as the team wins the matches by scoring goals, like a real-life football match.

Here we have listed the main genres when it comes to categorizing games.

### 1. ACTION GAMES:

An action game is a video game genre that emphasizes physical challenges, including hand-eye coordination and reaction time.

The action category has some sub-categories and they are listed below:

- **Stealth Game:** These games lean towards emphasizing trick and precision in striking over the more obvious and unconcealed shooters. Examples are: Metal Gear series, IGI series etc.

It is totally different from shooter games. This type of game makes staying undetected by enemies by hiding, sneaking using disguises.

Example: While playing if the player gets some special abilities or gadgets or information that the player can get during the game.

- **Stealth Game:** These games start with a minimal resource with the player, in a hostile condition, along with open world situation with the objective to collect resources, craft tools, artilleries and arms & protection, in order for the survival of the player as the game proceeds.
- **Shooter Games:** In these games, players draw on a range of weapons for contributing in the action that takes place at a distance.

It focuses on the defeat of the characters, enemies using ranged weapons given to the player.

The common resource found in many shooters games ammunition.

**Ammunition:** It is the material fired, scattered, dropped from any weapon.

- **Platform Games:** These games are set in three-dimensional (3D) environment where the player guides the character through the obstructions for advancement in game.

## 2. ADVENTURE GAMES:

Just like adventure movies, games with the storyline of adventure are full of fictional landscapes, characters etc. These games portray a different way of gameplay without excessive reflex, hard core challenges or actions.

The focus lies on the player in solving puzzles or mysteries by interacting with the environment.

**EXAMPLE:** Mario, Tin-Tin are examples of adventure games.

Some categories of adventure games are:

- **Graphic Adventures**
- **Visual Novels (based on novels and stories)** – Harry Potter (played using PlayStations, X Box and other gaming consoles)
- **Interactive Adventures (based on movies)** - Tin-Tin, Batman etc.
- **Real-time 3D Adventures** - Shadow of Memories

## 3. ROLE PLAYING GAMES:

A player is chosen who plays the major role in the storyline full of numerous **adventurers** and specializes in particular skill sets and that player progress in the storyline incrementing his skills and powers. This category is one of the most famous genres and is played by gamers worldwide.

Here's a list of some sub-categories of role-playing games:

- **The roguelike Game:** It is a sub-genre and its name comes from the gameplay elements of 1980 computer game **Rogue**.

**Example:** Nethack is another example of roguelike game.

- **Fantasy Games:** Games such as **Diablo, Final Fantasy, Prince of Persia** have a world full of unusual characters and villains and the player has to complete the levels full of challenges and mysteries and there lies some hidden routes which needs to be unlocked to proceed with the game.

- **Sandbox RPG (Open World RPG):**

These are modern games where the player is given full freedom and can freely roam around and do anything (i.e. the player is not restricted to a single path by rocks & fences, single objective etc.).

Examples of such games are the famous **Grand Theft Auto (GTA) series, Watch Dogs Series etc.**

These games provide a large geographic area to explore along with the primary objectives and tasks of the game.

- **Massively multiplayer online role-playing games (MMORPG):**

This term came into existence commercially in the year 1990s and had existed since 1978. This involves more than hundreds of players interacting and cooperating with each other on the same platform in real-time.

#### 4. SIMULATION GAMES:

These are primarily designed and developed to closely simulate(replicate) all the aspects of our real life or a fictional setup.

The various sub-categories of simulation games are: -

- Farming Simulation
- Vehicle Simulation
- Life Simulation
- Management Simulation

#### 5. STRATEGY GAMES:

The main focus lies on the gameplay which require a cautious and skilled mindset and a good plan for being victorious.

- **4X Game:** 4X games refer to a genre of a specific form of strategy video games having four primary goals which are-
  1. **eXplore**

2. **eXpand**
3. **eXploit**
4. **eXterminate**

- **Real-time strategy (RTT) and War games:**

The real-time strategy games are characterized by acquiring resources, building bases and other assets within the game, and the player has to make specific decisions and perform certain actions constantly in order to cope up with the changing game state.

**For example: Age of Empires etc.**

- **Tower Defence:**

Tower defence games have a very simple format and gameplay. Make your tower strong by deploying suitable defense system to demolish the enemy troops.

- **Multiplayer Online Battle Arena (MOBA):**

MOBA games are also called the action real-time strategy (ARTS) games, which is a sub-genre of strategy games which was originated as a real-time strategy game wherein a player takes control over a single character in one of two teams.

## **6. SPORTS GAMES:**

These games emulate the gameplay of any traditional physical sports to be played on a device. The real-world sports like baseball, basketball, soccer, and more are available in the form of PC games.

As you grow your skill levels, your game will also engage in mimicking real professional athletes and the way they move and play.

Its sub-types are:

- Racing

- Indoor Sports
- Outdoor Sports
- Fighting
- Competitive and Misc

## 7. SCIENTIFIC AND EDUCATIONAL GAMES:

There are a handful of great educational games out there which can actually help children and kids and even grownups to learn new things and gather knowledge.

- 8. Casual Game:** A casual game is a video game targeted at or used by a mass audience of casual gamers.
- 9. Programming Game:** A programming game is a video game that incorporates elements of computer programming, enabling the player to direct otherwise autonomous units within the game to follow commands in a domain-specific programming language, often represented as a visual language to simplify the programming metaphor.
- 10. Logic Game:** Logic games are unique puzzles found nowhere else but on the LSAT.  
**Example:** Logic puzzle, including Sudoku, Futoshiki, Kakuro, etc.  
Logic games, a section of the LSAT. a game-theoretical device for defining the semantics of a logic.
- 11. Music Game:** Music video game where the gameplay is meaningfully and often almost entirely oriented around the player's interactions with a musical score or individual songs.
- 12. Party Game:** Party video games are commonly designed as a collection of simple minigames, designed to be intuitive and easy to control, and allow for competition between many players.
- 13. Trivia Game:** A trivia game or competition is one where the competitors are asked questions about interesting but unimportant facts in many subjects.

**14. Board Game/Card Game:** Card video gaming refers to the use of cards in electronic or digital gaming devices to play various games of chance.

These games can include card games, such as poker or blackjack, as well as games that combine cards with other elements, such as dice or football simulations

### **Benefits of Understanding the Genre of Game:**

It is very crucial to understand the genre of the game before starting with game development. If you are working for some client for Game development project, try to understand the genre of the game that your client has in mind, it will help you with following:

1. Design the theme of your Game. An adventure game may look good with a forest backdrop, while a game being designed for school kids would look good with colorful backdrop etc.
2. Game sounds also depend upon the genre of the game.
3. Use of blood and violence in the game is only advised for Action games for 18+ age group players.

Hence, you get a lot of ideas once the genre of the game is defined