CBCS SCHEME

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22MCA423

Fourth Semester MCA Degree Examination, June/July 2025
Fundamentals of Game Design

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Differentiate between conventional games and video games.	10	L1	CO1
	b.	List and explain the key components of video games.	10	L2	CO2
		OR			
Q.2	a.	Describe the structure of video game.	10	L2	CO2
	b.	What are the different game design team roles? Explain.	10	L1	CO2
		Module – 2			
Q.3	a.	What is a Genre? Explain shooter and strategy games.	10	L2	CO3
	b.	Discuss Vanden Berghes five domains of play in detail for games.	10	L2	CO3
		OR			
Q.4	a.	List and explain measurable qualities of dedicated games.	10	L2	CO3
	b.	Describe Carolyn Handler Millers seven kisses of death.	10	L2	CO3
		Module – 3			
Q.5	a.	What do you mean by Home Game Consoles? Explain in detail.	10	L2	CO2
	b.	Discuss the different indirect payment modes for video games.	10	L2	CO2
		OR			
Q.6	a.	Compare and contrast between stand alone games and browser based games.	10	L2	CO3
	b.	Explain the Traditional and Emerging Markets for video games.	10	L2	CO2
		Module – 4			
Q.7	a.	Describe the properties of physical dimension of a game world.	10	L1	CO4
	b.	Differentiate the following: i) Constrained vs Freeform Creative Play ii) Functional vs Cosmetic Attributes	10	L1	CO4

		OR			
Q.8	**a.**	Explain the following: i) Level Editors ii) Bots	**10**	**L2**	**CO3**
	b.	Depict the relationship between Player and Avatar.	**10**	**L1**	**CO4**
		Module – 5			
Q.9	**a.**	Explain character dimensionality for defining characters of video games.	**10**	**L1**	**CO4**
	b.	What is the need of storytelling engine? Explain in detail its role with diagram.	**10**	**L2**	**CO2**
		OR			
Q.10	**a.**	Define Branching Story. Describe the branching story structure along with its disadvantages.	**10**	**L2**	**CO3**
	b.	Explain the emotional limits of interactive stories.	**10**	**L1**	**CO1**

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1.a. Differentiate between Conventional and video games.

Conventional games must have a thorough understanding of the essential elements play, rules, goals, and so on and should be able to design an enjoyable game with nothing but paper and pencil. Video games are a subset of the universe of all games. A video game is a game mediated by a computer, whether the computer is installed in a tiny keychain device such as a Tamagotchi or in a huge electronic play environment at a theme park

Hiding the Rules Unlike conventional games, video games ordinarily do not require written rules. The game still has rules, but the machine implements and enforces them for the players.

Setting the Pace In conventional games that don't use a timer, either the players or an independent referee sets the pace of the game—the rate at which the events required by the rules take place. In effect, it is up to the players to make the game go. In video games, the computer sets the pace and makes the game go. Unless specifically waiting for the player's input, the computer keeps the game moving forward at whatever pace the designer has set.

Presenting a Game World The players can think of themselves as make-believe characters in a make-believe place. With conventional games, this takes place primarily in the player's imagination, although printed boards, cards, and so on can help. Video games can go much further. By using a screen and speakers, video games present a fictional world the players can sense directly. Modern video games are full of pictures, animation, movies, music, dialog, sound effects, and so on that conventional games cannot possibly provide.

Creating Artificial Intelligence AI brings considerably more to video gaming than artificial opponents for traditional games. Game developers use AI techniques for the following: strategy, pathfinding, natural language parsing, natural language generation.

1.b. List and explain the key components of video games.

Core Mechanics:

One of a game designer's tasks is to turn the general rules of the game into a symbolic and mathematical model that can be implemented algorithmically. This model is called the core mechanics of the game. The model is more specific than the rules. The core mechanics are at the heart of any game because they generate the game-play. They define the challenges that the game can offer and the actions that the player can take to meet those challenges. The core mechanics also determine the effect of the player's actions upon the game world. The mechanics state the conditions for achieving the goals of the game and what consequences follow from succeeding or failing to achieve them. One quality of the core mechanics is their degree of realism.We will decide what degree of realism that our game will have when we decide upon its concept.

The decision we make determines how complex the core mechanics are.

For example, a real army requires a large general staff to make sure the army has all the ammunition and supplies it needs. In a game, a single player has to manage everything, so to avoid overwhelming him, the designer abstracts these logistical considerations out of the model

User Interface:

UI is designed to be as efficient as possible and to present the user's work clearly.

The user interface mediates between the core mechanics of the game and the player (see Figure 2.1).

It takes the challenges that are generated by the core mechanics (driving a racing car, for example) and turns them into graphics on the screen and sound from the speakers.
It also turns the player's button presses and movements on the keyboard or controller into actions within the context of the game.As the user interface lies between the player and the core mechanics, it is sometimes referred to as the presentation layer.It presents the story of the gameAll the artwork and all the audio of the game are part of its user interface, also known as its presentation layer. Two essential features of the user interface of a game are its camera model and its interaction model

Interaction Models:

The relationship between the player's inputs and the resulting actions is dictated by the game's interaction model.The model determines how the player projects her will, her choices, and her commands, into the game.Video games use a number of standard interaction models, including multi presence, avatar-based models, contestant models, and so on.
In a multi-present model, for example, the player can act on different parts of the game world whenever she wants to, reaching "into" it from the "outside."Just as the visible parts of a game's user interface change during play, a game can have more than one interaction model depending on what is happening at the time

Camera Models:

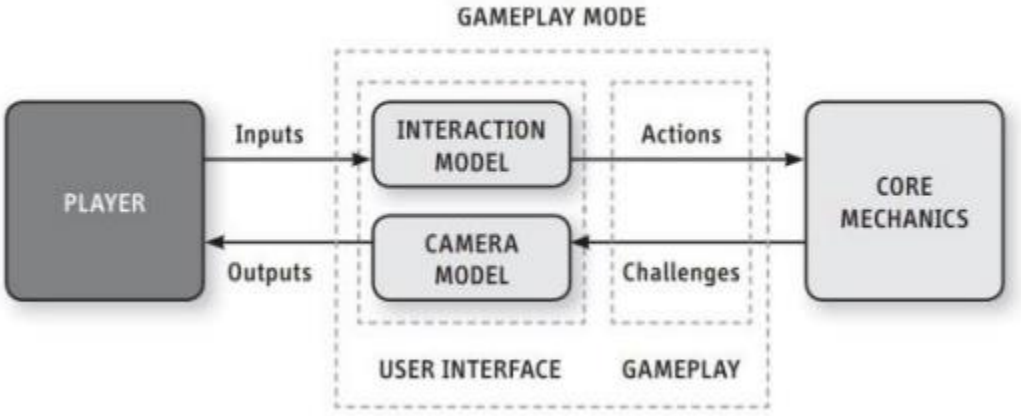
If a game includes a simulated physical space, or game world, then it almost certainly uses graphics to display that space to the player. The user interface must display the space from a particular angle or point of view. Designers usually imagine that a hypothetical camera is pointed at the virtual space, creating the image that the player sees. The system that controls the behavior of this imaginary camera is called the camera model. To define the camera model, think about how you want the player to view the game world and specify a system in your design documents that the programmers can implement. Static camera models is in which the camera always shows the virtual space from a fixed perspective
Dynamic camera models require more effort to design and implement, but they make the player's experience livelier and more cinematic. The most commonly used camera models are first person and third person for presenting 3D game worlds and top-down, side-scrolling, and isometric for presenting 2D worlds.

2.a. Describe the structure of video games.

How and why the changes occur are determined by the game's structure. The structure is made up of gameplay modes and shell menus.

GamePlay Modes:

• The combination of related items available gameplay and supporting user interface at a given point in the game—collectively describe something called a gameplay mode.
• A gameplay mode consists of the particular subset of a game's total gameplay that is available at any one time in the game, plus the user interface that presents that subset of the gameplay to the player.
• The concept of the gameplay mode is central to the process of designing video games.
• A game can be in only one gameplay mode at a time.
• Many of the earliest arcade games have only one gameplay mode. In Asteroids, for example, you fly a spaceship around a field of asteroids, trying to avoid being hit by one and shooting at them to break them up and disintegrate them. The camera model and the interaction model never change, nor does the function of the controls.



Shell Menus and Screens:

• modes in which the player cannot affect the game world but can make other changes is called shell menus.

• Non interactive sequences such as title screens or credits screens are called shell screens.

The Game Structure:

• The gameplay modes and shell menus of the game, and the relationships among them, collectively make up the structure of the game.

• To document the structure, you can begin by making a list of all the modes and menus in the game.

• You must also include a description of when and why the game switches from one mode or menu to another: what event, or menu selection, causes it to change.

• Each mode or menu description should include a list of other modes and menus it can switch to and, for each possible switch, a notation about what causes it

• A better approach is to document the structure of a game with a flowboard, a combination of flowchart and storyboard.

2.b. What are the different game design roles? Explain

Lead Designer. This person oversees the overall design of the game and is responsible for making sure that it is complete and coherent. She is the "keeper of the vision" at the highest and most abstract level. She also evangelizes the game to others both inside and outside the company and is often called upon to serve as a spokesperson for the project. A project has only one lead designer.

General Game Designer. A game designer who doesn't have a specialized role like the ones that follow is usually responsible for a little bit of everything, but in particular defining the gameplay—the challenges the player will face and the actions that he can take to overcome those challenges. This may include thinking up and describing a great many game elements: enemies, friendly non-player characters, types of units, and so on

Level Designers: Level designers take the essential components of the game provided by the other designers—the user interface, core mechanics, and gameplay—and use those components to design and construct the individual levels that the player will play through in the course of a game. On large games, level designers frequently need to build 3D models and program in scripting languages.

User Interface Designer: If a project includes user interface design as a separate role, it's performed by one or more people responsible for designing the layout of the screen in the

various gameplay modes of the game and for defining the function of the input devices.
Writer. Writers are responsible for creating the instructional or fictional content of the game: introductory material, back story, dialogue, cut-scenes (non-interactive narrative video clips), and so on.

Art Director. The art director, who may also be called the lead artist, manages production of all the visual assets in the game: models, textures, sprites, animations, user interface elements, and so on. The art director also plays a major role in creating and enforcing the visual style of the game. the art director is usually at the same level as the lead designer

Audio Director. Like the art director, the audio director of a game oversees production of all the audible assets in the game: music, ambient sounds, effects, and dialogue or narration.

Lead Programmer. The lead programmer oversees the coding team and is responsible for the technical design of the game, as well as the quality of the software.

Producer or Project Manager Job roles in the game industry are not standardized, but typically a producer has overall responsibility for the game as a commercial product, and in addition to thinking about development, he also works with marketing, public relations, and community managers (if any) to help build excitement about the game before release.

Producers usually expect to have a fair amount of creative input into the design, and they expect veto power over expensive or unworkable suggestions. The producer may also track the day-to-day progress of development, making sure that tasks are getting completed and that nobody is stuck waiting for something else to happen

3.a. What is a genre? Explain shooter and strategy games.

A genre is a category of games characterized by a particular set of challenges, regardless of setting or game-world content.

Strategy Games:

Strategy games include strategic (naturally), tactical, and sometimes logistical challenges. They may also offer economic and exploration challenges to lengthen the game and give it more variety.

They also have a physical challenge thrown in for spice, but this often annoys strategically minded players.

Shooter Games

In shooters, the player takes action at a distance, using a ranged weapon. Therefore aiming is a key skill,particularly if the game provides limited ammunition. In a shooting game, the player must focus attention on two places at once: the area around the avatar, and the target or targets. Shooters can be subdivided into 2D shooters and 3D shooters, of which by far the most famous are the first-person shooters.

2D Shooters

The action in 2D shooters takes place in an environment viewed from a top-down or side-view perspective, or occasionally from a fixed first-person perspective in which the player faces oncoming or pop-up targets. Enemies shoot at the avatar, which can be a character or a vehicle, or approach to attack at close quarters. In many of these games, the player is under attack by overwhelming numbers of enemies and must shoot them as fast as possible; such games are often called shoot-'em-ups. The player is usually armed with one or more weapons, and some weapons may be better suited to particular enemies than others. It is rare for a 2D shooter to keep track of ammunition (except for particularly powerful types of weapons); instead, the player fires frenetically and indiscriminately. The weapons seldom damage anything except legitimate targets.

3D Shooters

3D shooting games, such as those in the Halo and Crysis series, have become so successful that to a great many younger gamers they are the epitome of the entire medium. 3D shooters are more realistic than 2D shooters, often presenting familiar, or at least recognizable, worlds . In first- person shooters, the physics of the game is reasonably like that of the real world. Gravity works correctly (for the most part), sound diminishes with distance, objects cast shadows, and collisions are modeled with a fair level of accuracy.

3D shooters use either a first-person perspective (the first-person shooter or FPS) or a third-person perspective, and many now offer both. The first-person perspective is sometimes reserved for the view through a rifle's scope or sights and usually cannot be used while the avatar is moving.

3.b. Discuss Vanden Berges five domains of play in detail for games.

VandenBerghe's work is based on a well-known psychological model of human personality traits called the Five Factor Model. also known as "The Big Five," explains personality traits in terms of five non overlapping domains:

Openness to new experiences
Conscientiousness
Extraversion
Agreeableness and
Neuroticism

Novelty:

• Players who seek novelty like games that include a lot of variety and unexpected elements.
• People who don't like novelty seek familiarity instead: games that offer them a comforting sameness.
• These players might prefer Words with Friends to a science fiction extravaganza set in a strange world with strange rules

Challenge:

• VandenBerghe correlates a desire for challenge—and perhaps more specifically effort and control—with the trait of conscientiousness.
• High-challenge players prefer games that are difficult and require precision to win.
• Their conscientiousness drives them to act, to accomplish things, and perhaps to try to complete everything in a game.
• Low-challenge players like sandbox games and others in which the player is free to fool around without being required to achieve something.

Stimulation:

• Particularly via social engagement, this naturally correlates with extraversion.
• These players enjoy party games and others that involve interacting with other players.
• Those who prefer to avoid stimulation prefer games they can play alone, games that let them be the only real person in the game world.

Harmony:

• the feeling that all parts of the game belong to a single, coherent whole.
• VandenBerghe is referring to social harmony and correlates this motivation with the personality trait of agreeableness.

Threat:

• This domain is the most peculiar one because players' reactions to it are the opposite of what you might expect.
• The game quality of threat (an element of danger, or frightening content—anything that is likely to generate unpleasant emotions) is popular with people who have high neuroticism scores in OCEAN tests.

4.a. List and explain measurable qualities of dedicated games.

The 15 measurable qualities of dedicated gamers that Ip and I proposed are as follows:

1. Technologically savvy. Highly dedicated gamers are more familiar with the latest releases and developments and show greater interest in new gaming-related technologies.
2. Have the latest high-end gear. Dedicated gamers will acquire the latest consoles, PC hardware, and mobile devices to keep up to date with the most recent trends. They are more likely to own, or have owned, a wide variety of older game platforms.
3. Willingness to pay. Enthusiasts are more inclined to spend money on games and games-related products. Conversely, casual gamers are more inclined to wait for price discounts and special offers before committing to a purchase.
4. Prefer violent/action games. Kim suggested that hardcore gamers prefer games that show comparatively violent and action-intensive content.
5. Prefer games that have depth and complexity. Dedicated gamers prefer games that deliver greater complexity and that require a longer time to master, regardless of their themes.
6. Play games over many long sessions. Dedicated gamers are likely to devote considerably more time to playing games in a single session.
7. Hunger for gaming-related information. Devouring everything from the latest news, previews, and reviews, to interviews with industry experts, the hardcore gamer actively seeks gaming-related information through the Internet, game magazines, and books, such as strategy guides.
8. Discuss games with friends online. Dedicated gamers like to discuss gaming with others and to visit game-related Internet forums or chat rooms regularly.
9. Play for the exhilaration of defeating (or completing) the game. A dedicated gamer will play persistently for the enjoyment and exhilaration of defeating the game and is likely to be more forgiving of aesthetic flaws such as poor acting or a trivial plot.
10. Much more tolerant of frustration. Hardcore gamers are much more tolerant of difficult games or games that might frustrate them in some way. Casual gamers are more likely to abandon such games.
11. Engaged in competition with himself, the game, and other players. Hardcore gamers want to feel the satisfaction and reward of competing and improving their skills against other players and/or computer-controlled opponents. Less dedicated gamers would not, for example, be inclined to play endlessly to reduce their lap-times in Gran Turismo by a fraction of a second, or have the patience to learn every combination attack in Street Fighter, or even to achieve a higher score.
12. Age at which first started playing games. If players started playing at a young age, and have since been regular gamers, then this would indicate those who are more experienced and knowledgeable. Gamers who start playing later in life are seldom as dedicated.
13. Comparative knowledge of the industry. Dedicated gamers are likely to show broader knowledge and awareness of industry activities and trends, new technologies, and game development methods.

Less dedicated players may keep track of upcoming releases and game reviews, but not events such as industry layoffs or mergers.
14. Early adoption. Dedicated gamers are the ones who attend midnight release events or take extra steps to get hold of games before their official release dates through gray-market imports.
15. Desire to modify or extend games in a creative way. Hardcore gamers frequently modify commercial games in a variety of ways. These can range from simple changes such as giving characters new skins to change their appearance to programming "aim-bots," separate pieces of software that work in concert with an existing game to give the player an unfair advantage over others. Casual gamers seldom take the time to make these kinds of modifications; they tend to play the game as-is out of the box.

4.b. Describe Carolyn Handler Millers seven kisses of death.

Death Kiss #1: Kids love anything sweet. Kids love some things that are sweet, some of the time, but not anything and not all the time. Think about the Warner Brothers cartoons: wisecracking Bugs Bunny; Sylvester the Cat's endless efforts to eat Tweety Bird; Wile E. Coyote's similarly endless efforts to kill the Roadrunner; homicidal Yosemite Sam and rabbit-cidal Elmer Fudd. Kids love these cartoons—which actually include a sneaky moral about violence redounding upon the violent—but there's nothing remotely sweet about them.

Death Kiss #2: Give them what's good for them. Kids are forever being told what's good for them. They're made to eat food they don't like; they're made to go to school; they're made to do chores, learn to play the piano, and a million other things supposedly meant to build their characters or strengthen their bodies or minds. Most of this is reasonable and necessary, but not in an entertainment context. How would you, as an adult, like to be fed a dose of propaganda with every book and TV show you saw? You wouldn't, and neither do kids. When they want to relax and have fun, they don't want a dose of medicine with it.

Death Kiss #3: You've just got to amuse them. This is the opposite of Death Kiss #2; it cynically assumes that kids are less discriminating than adults, so any old fluff will do. It won't. Kids can't tell the difference between good acting and bad acting, and they aren't experienced enough to recognize clichéd plot lines, but they won't put up with just anything. Walt Disney realized this, and so do the writers and animators who continue his work; Disney movies are multilayered even though they are for children. So, too, are the best children's books. Meaningful content will keep a child's attention longer than trivial content.

Death Kiss #4: Always play it safe! This is a variant of the "sweet" Death Kiss. Some people, in an effort to avoid violent or controversial content, go overboard and try to eliminate anything that might frighten or disturb a child or even raise her pulse. This inevitably results in bland, dull entertainment. Again, look at Disney films for good counter-examples: Dumbo's separation from his mother; Snow White's terrified flight through the forest; the outright murder of Simba's father in The Lion King. These are not happy things, and that's OK. Gerard Jones argues in his important treatment of the subject Killing Monsters: Why Children Need Fantasy, Super Heroes, and Make-Believe Violence (Jones, 2002) that learning to deal with threatening situations constitutes an important part of growing up.

Death Kiss #5: All kids are created equal. There's no such thing as a single children's market. Kids' interests and abilities change too quickly to lump them all into a single category. If you're planning to make a game for ages 6 to 10 and the publishers decide they

want a game for ages 8 to 12, you'll have to redesign the game. One-size-fits-all definitely doesn't work with kids.

Death Kiss #6: Explain everything. Kids are much happier with trial-and-error than adults are, and they don't want long introductions explaining how to play the game. They want to dive in and play.

Above all, avoid talking heads with a lot of jabber. Adults naturally tend to assume that kids need things explained to them, but it's not true of video game worlds in which they can't hurt themselves or anything else. Keep exposition and especially anything that smacks of teaching them to a minimum.

Death Kiss #7: Be sure your characters are wholesome! Wholesome equals boring. We wouldn't put up with bland white-bread characters in our entertainment; why should we make children do so? You don't have to introduce serial killers, but create real characters with their own personal foibles. Sesame Street famously offered a variety of characters, many specifically designed to represent moods or attitudes familiar to young children: greedy, grouchy, helpful, and so on.

5.a. What do you mean by Home Game Consoles? Explain in detail.

A home game console is usually set up in the living room or a bedroom. The player sits or stands holding a dedicated controller 3 to 10 feet away from the television that serves as its display. Although modern high-definition digital televisions are a great improvement over the analog sets that the early consoles used, the player is still too far from the screen to see small details or to read fine print conveniently. This means that games designed for the home console machine cannot be as intricate as the personal computer games can. The graphics have to be simpler and bolder. Because several people see the display at once, and because all consoles allow for at least two controllers, console machines are excellent for multiplayer local games in which all players look at the same screen.

On the other hand, console games are not so good for games that require individual players to have secret knowledge, because every player can see what every other player is doing on the screen. Also, because they're set up in a private house, players can use them for a long time with (comparatively) few distractions, so games can be designed and paced with this in mind. Mobile games, in contrast, need to be played for minutes, not hours.

Home consoles are dedicated gaming machines. They have no other function as computers; a few efforts were made to make them more general-purpose by adding keyboards—these never really caught on. Although it is possible to surf the web on them, the lack of a keyboard and the poor quality of their pointing devices limits what you can do with them.

Input Devices In a console game, the control method and user interface must be manageable with the controller provided. A mouse can point much more precisely than most console controllers. Still, you are guaranteed that every machine ships with a standardized controller, which means you don't have to do the configuration testing that games for the PC sometimes require. Generally speaking, hardware developers create a much larger variety of input devices for console machines—steering wheels, guitars, conga drums, fishing rods, balance boards, and so on—than they do for the PC.

5.b. Discuss the different indirect payment modes for video games.

By allowing them to pay a little at a time, or only for the parts of the game that they want to pay for, we make it easier to attract them to our games. However, most of these models work only with games that are delivered online, either with a continuous

or a periodic connection to a server operated by the development company.

Freemium Games:

• In the freemium (free+premium) model, a business gives away a partially functional version of its software but allows customers to purchase upgrades that render it more useful.
• The first products to be widely successful under the freemium model were antivirus suites.
• In the case of games, you give away the game but offer premium items for sale within the game (called in-app purchases or IAPs) that make the game more fun or interesting.
• This usually takes the form of downloadable content (DLC).
• Downloadable content can consist of all kinds of things: extra levels, new clothing for an avatar character, additional game modes, and new objects in the game, such as weapons or powerups.
• Dance games often offer additional music as downloadable content, which helps to keep the experience fresh if the players are getting tired of the music that came with the original game.
• The chief criticism of the freemium model, from a player's perspective, occurs when the game isn't any fun without buying the premium content
• The freemium model affects game design because rather than designing one single experience, you have to design an experience that can be upgraded through purchase and you have to make sure that these purchases are desirable enough that you can earn a living from your game

Free-to-Play:

• In free-to-play games, players get a version of the game that is free but is designed to encourage them to pay a subscription or some other kind of fee
• A common design allows players to play completely free of charge forever, but advancement in the game is very slow, and players must log off periodically and come back later to continue. Paying a fee removes this limitation.
• Another approach puts free players on one set of servers and paying players on another. The servers for paying players are much less crowded, so the player experiences better performance from the game.
• Many free-to-play games are designed to offer the player a small amount of advancement in the game at frequent intervals in response to fairly trivial player activities sometimes this means the player doesn't have to do anything more than click a button to advance, as in Mafia Wars.
• The free-to-play model is closely related to the freemium model, and many free-to-play games also include premiums that players can buy

Advertising and Sponsorships:

• You can earn revenue by selling advertising alongside your game. Advertising that appears beside your game on the player's screen does not intrude too much, and you earn money for each person who sees, or clicks on, one of the ads
• This model is normally used for online games and, if successful, can even enable you to give away the game for free and make all the money from the ads.
• Example facebook games and yahoo games
• Some developers also sell an ad-free version of the same game to players who don't

like the advertisements and are willing to pay not to see them.
• You can also have advertisements appear within your game; you do this by selling sponsorships to companies that want to have their message in your game world.
• If your game is a standalone game sold at retail or online, the sponsor simply pays you based on the number of copies that you sell; if the game is an online game delivered via a server, they will pay you per view or per click as is done when the advertising appears alongside the game.
• Sponsorships are most common in sports games and vehicle simulations that emulate a real-world sport or car race.
• The design implications of advertising, and especially of sponsorship, are that your game content must not upset your sponsors

Commissioned Games:

• which you get paid to build a game for someone else, but you don't get any royalties for sales.
• The only money you see is what you get paid to build the game in the first place, which means that you must build your profit margin into the price you charge to do the work.
• For charity or government agency

6.a. Compare and contrast between stand alone games and browser based games.

STAND ALONE GAMES: stand-alone PC games can be the most visually spectacular. If we want to develop for the highest-end gear, you should build stand-alone PC games. That choice usually limits the size of your market to the truly dedicated hobbyist gamer. On the other hand, many stand-alone games are aimed at the middle of the range and do very well. Most edutainment games are stand-alone games because it's easier for a parent to help a young child with a keyboard and mouse than a handheld controller.

BROWSER-BASED GAMES: Browser-based games are a rapidly growing sector of the game market. Because they run in a web browser, they are isolated from the machine's hardware. A browser-based game can run on a Windows PC, Macintosh, or Linux machine with no modifications. This advantage comes at a price, however; browser-based games cannot take full advantage of the machine's capabilities, and this usually includes 3D rendering. Most browser based games—and there are thousands—are 2D games aimed at the casual player. They are often written in Java or Adobe's ActionScript language, which works with Flash Player.

6.b. Explain the traditional and emerging markets for video games.

Traditional Markets The traditional markets for video games are, not surprisingly, in the developed and high-tech world. Even these, however, are quite distinct. They include

The English-speaking world. The U.S. is the largest market for video games in the world, and the vast majority of games, no matter where they are developed, are aimed at this market. (Games made by the Japanese for their own large market are a notable exception.) Americans like happy endings; they prefer to see virtue rewarded. Grim Kafka-esque stories are not popular except among a subcategory of disaffected youth. Games with military themes also sell well generally in the U.S., but as the country that invented video games, with a large, diverse population, almost any kind of game can be developed for this audience.

Continental Europe. European demand for games is similar to the American demand, but Europe is more complicated to develop for because each nation has its own language, and tastes in games vary somewhat among them. Many Northern Europeans (Nordic countries

and the Netherlands) are happy to buy games in English because they routinely learn English in school. The largest markets, however, including France and Germany, prefer games in their own language. In general, Europeans like darker stories and regard some games made for Americans as rather saccharine. They are much less concerned by nudity and sexual themes than Americans are and are more disturbed by violence. Also, as a result of
their experience with Nazi Germany, Europeans are suspicious of overt displays of patriotism. A uniform labeling standard called Pan European Game Information (PEGI) is emerging so that developers don't have to submit their games to be rated to authorities in each country

Japan. The Land of the Rising Sun is unique among video-game-playing countries. Some of the most successful game characters and franchises (Mario, Zelda, Final Fantasy, Metal Gear Solid, and so on) come from Japan, yet these games make few concessions to Western tastes. Rather, Western gamers have come to appreciate Japanese games just as they are. The converse is not the same, however; the Japanese do not play many Western games, and it is almost impossible for a Western game company to work in Japan without a Japanese partner. Japan has a large and highly successful game industry of its own, and in addition to the worldwide hits just mentioned, the game industry in Japan makes many,many games that they never export because the Japanese consider them too distinctly Japanese to be
popular elsewhere.

South Korea. Korean demand for games is not as great as that of Japan and, as a more socially conservative country, erotic content is less acceptable. The most distinctive feature of Korean gaming is how Koreans like to play: in public spaces. Role-playing and real-time strategy games and especially massively multiplayer online role-playing games (MMORPGs) are particularly popular, and these are played in a PC bang (literally, "PC room")—a large commercial space outfitted with many desks and LAN connected PCs, rather like an Internet café only much bigger. Professional gaming is also more popular in South Korea than anywhere else.

Emerging Markets:

China. Although China is not as economically advanced as the rest of the Far East, its sheer population makes it one to watch in the future. Software piracy is rampant in China, so developers have turned to selling online games that use a subscription or freemium model; as a result, China now contributes one third of the worldwide online gaming revenue. Video game consoles were banned as harmful to youth education until 2013, and it remains to be seen if sales will be significant now that they're allowed.

Because few Chinese can afford personal computers, Internet cafés are popular. The Chinese government is cautiously supportive of gaming, but is suspicious of anything that could be interpreted as criticism of the authorities or their policies.

India. With a population close to that of China and a growing middle class, India is the next country to watch as an emerging market. However, despite these indicators, the country is unlikely to take up PC and console games in large numbers soon. Despite having a similar population, India has only a little over one-fourth as many PCs as China does. In India, there is a strong emphasis on education, which makes parents reluctant to buy consoles. Consequently, the Indian gaming revolution, when it comes, will almost certainly be on mobile phones. At the moment only 10 percent of India's 400 million mobile phones are smartphones capable of playing games, but we can expect this to change over the next few
years.

Mexico, Central, and South America. This region has a rapidly growing enthusiasm for games, but of course it has a far smaller population than either of the two preceding countries. Brazil is an emerging economic powerhouse, and the Mexican retail video game industry is now larger than the movies and music industries combined, and it is still growing rapidly.

The Islamic world. Certain parts of the Islamic world (Saudi Arabia, the Emirates) are very wealthy and can easily afford video games, while others (Sudan, Palestine) are severely disadvantaged. These markets will continue to grow in the future, though much more slowly than India and China. The real obstacle to acceptance of video games is cultural. Muslim countries have no history of video gaming and are unlikely to want games made for the West. Their social conservatism, even greater than that of India, means that great care must be taken not to offend local sensibilities. Contrary to stereotype, most of the Muslim world does not speak Arabic (the largest Muslim country in the world is Indonesia), but there is a band of Arabic-speakers from North Africa to Iraq that will make it easier to localize games for those countries

Sub-Saharan Africa. This region will be the last to get into video gaming for both financial and cultural reasons. These nations speak hundreds of different languages and localizing for them will be extremely difficult; in addition, they have less money available for luxury entertainment like video gaming, and no history of involvement with high technology

7.a. Describe the properties of physical dimensions of a game world.

Video game worlds are almost always implemented as some sort of simulated physical space. The player moves his avatar in and around this space or manipulates other pieces or characters in it. The physical properties of this space determine a great deal about the gameplay. Three of these properties are spatial dimensionality, scale, and boundaries.

Spatial Dimensionality:

It is essential to understand that the dimensionality of the game's physical space is not the same as how the game displays that space (the camera model) or how it implements the space in the software.

These are the typical dimensionalities found in video games

2D. Thanks to the explosion in casual and mobile gaming, most of the video games in the world still have only two dimensions. This design is especially noticeable in 2D side-scrolling games such as Prince of Persia Classic, a remake of the original Prince of Persia. The two dimensions of the world directly correspond to the two dimensions of the monitor screen, so you don't have to worry about conveying a sense of depth to the player. Some games with 2D game worlds still use 3D engines to display the world so that objects appear three-dimensional even though the gameplay does not use the third dimension.

2.5D, typically pronounced "two-and-a-half D." This refers to game worlds that appear to be threedimensional spaces, but in reality, consist of a series of 2D layers, one above the other. StarCraft, a war game, shows plateaus and lowlands, as well as aircraft that pass over obstacles and ground units. The player can place objects and move them horizontally within a layer with a fine degree of precision, but vertically an object must be in one plane or another; there is no in-between. Flying objects can't move up and down in the air

3D. Three true dimensions. Thanks to 3D hardware accelerators and middleware engines like Unity, 3D spaces are now easy to implement on hardware that supports them. They give the player a much greater sense of being inside a space (building, cave, spacecraft, or whatever) than 2D spaces ever can. With a 2D world, the player feels as if he is looking at it; with a 3D

world, he feels as if he is in it. 3D worlds are great for games with exploration challenges or vehicle simulations such as Need for Speed

4D. If you want to include a fourth dimension for some reason (not counting time), implement it as an alternate version of the 3D game world rather than an actual four-dimensional space. In other words, create two (or more) three-dimensional spaces that look similar but offer different experiences as the avatar moves among them. For example, the Legacy of Kain series presents two versions of the same 3D world, the spectral realm and the material realm, with different gameplay modes for each.

Scale

○ Scale refers to both the absolute size of the physical space represented, as measured in units meaningful in the game world (meters, miles, or light-years, for instance), and the relative sizes of objects in the game. If a game doesn't correspond to anything in the real world, the sizes of objects in its game world don't really matter. You can adjust them to suit the game's needs any way you like. Some distortion is necessary for gameplay as long as it doesn't harm the suspension of belief.

In Realistic scale for example in sports game it should be the vehicle simulator and first person view and in Aerial or isometric perspective we need to distort the scale of things. In SimCity Characters may need to walk at different speeds when they walk indoors and outdoors.

In war games, you have to adjust the speed and range of the weapon Some distortion is necessary. Airplanes, missiles, and rockets may need to be slowed down. In Air Land Battle Wargame: Red Dragon we need Distort the relative height of people and buildings: In Age of Empires we may want to slightly exaggerate the size of the key objects so it's more visible.

Boundaries In board games, the edge of the board is the edge of the game world. With procedural rendering, we can create unlimited game worlds, but normally we establish artificial boundaries to avoid overwhelming the player or letting her go into regions where no gameplay has been implemented. Computer games are usually more immersive than board games, and they often try to disguise or explain away the fact that the world is limited to help maintain the player's immersion.

In some cases, the boundaries of a game world arise naturally, and we don't have to disguise or explain them. Sports games take place only in a stadium or an arena, and no one expects or wants them to include the larger world. In most driving games, the car is restricted to a track or a road, and this, too, is reasonable enough

7.b. Differentiate the following.

i) Constrained vs Freeform Creative Play.

Constrained Creative Play	Freeform Creative Play
Creates Artificial constraints	No Constraints are applied
Incorporate Rules of the game	Will not have any rules of the game
Provides a structure for players creativity	Cannot see any possibility of players creativity
Players are offered with additional resources or tools with restrictions	Players need not be offered with additional resources or tools without any restrictions
Difficult to test aesthetic standards	Easy to test aesthetic standards
These games usually have an end goal	These games usually don't have an end goal

ii) Functional vs cosmetic attributes

Functional Attributes	Cosmetic Attributes
Interacts with core mechanics	No interaction with core mechanics
Focus on the fundamental aspects of a character	Focus on appearance of a character
Can be sub divided into characterization and status attributes	No other categories
Need to test	No need to test for every change
These attributes contribute to achieve goals and rules	These attributes will not contribute to achieve goals and rules
These attributes define the properties which changes frequently and slowly	These attributes define the properties which changes frequently and slowly
Example: airspeed of an aircraft	Example: color of an aircraft

8.a. Explain the following
i) Level Editors
ii) Bots

Level Editors A level editor allows players to construct their own levels for a game. Some level editors permit players to define only a new landscape; others allow them to define new characters as well; and a few go so far as to permit rebuilding the entire game. Generally, however, a good level editor lets the player construct a completely new landscape, place challenges in it, and write scripts that the game engine can operate. If you work on a large game for commercial sale, your team will almost certainly include tools programmers who will build a level editor for the level designers to use. To make the level editor available to the players, rather than useful only as an in-house tool, you must make sure it is as robust and well-designed as the game software itself.

Two superb level editors are the 2D StarCraft Campaign Editor, which is included with StarCraft, and the Hammer 3D editor that comes with Half-Life 2.

Bots A bot is an artificially intelligent opponent that the player can program for himself. By building bots, players can create tougher and smarter opponents than those that normally ship with the game (usually a first-person shooter). Some players use bots as sparring partners for practice before playing against real people in online tournaments

8.b. Depict the relationship between Player and Avatar.

The game industry uses the term avatar to refer to a character in a game who serves as a protagonist under the player's control. (The original term is Sanskrit and in the Hindu religion refers to the bodily incarnation of a god.) Most action and action adventure games provide exactly one avatar. Many role-playing games allow the player to manage a party of characters and switch control from one to another, but if winning a role-playing game is contingent upon the survival of a particular member of the party, then that character is effectively the player's avatar (though some games require that more than one character survive). The player usually sees the avatar onscreen more than any other character if the game is presented in the third person. Displaying the avatar requires the largest number of animations, which must also be the smoothest animations, or you risk annoying the player. The avatar's movements must be attractive, not clumsy, unless clumsiness is part of the

avatar's character Player-Designed Avatar Characters While most games have an established character as the player's avatar, role-playing games, especially multiplayer online ones, almost always give players considerable freedom to design an avatar to their own specifications. They can choose the avatar's race, sex, body type, hair, clothing, and other physical attributes, as well as a large number of other details, such as strength and dexterity, that have a direct effect on the way the avatar performs in challenging situations. Specific and Nonspecific Avatars In games in which the player does not get to design or choose an avatar but must use one supplied by the game, the relationship between the player and the avatar varies depending on how completely you, the designer, specified the avatar's appearance and other qualities. The earliest adventure games, which were text-based, were written as if the player himself inhabited the game world. However, because the game didn't know anything about the player, it couldn't depict him or say much about him. Such avatars were nonspecific that is, the designer didn't specify anything about them. Myst is an early example of a graphical game with a nonspecific avatar. The nonspecific avatar does not belong entirely to the past,
however. Gordon Freeman, the hero of Half-Life, does not speak and is never even seen in the game (although he does appear on the box). The designers did this deliberately; Half-Life, a first-person shooter in a world with no mirrors, offers Gordon as an empty shell for the player to inhabit. The Effects of Different Control Mechanisms The way a player feels about an avatar depends somewhat on how the player con trols the avatar in the game. In the case of Nancy Drew and the avatars in all other point-and-click adventure and computer role-playing games, the player's control is indirect; he doesn't steer the avatar around but points to where he wants the avatar to go, and the avatar walks there of her own accord. Male and Female Players and Characters Early in the history of video games, some designers were concerned that male players (who used to make up the majority of the market) would be unwilling to play female avatars: Men might find identifying with a female character somehow threatening. Lara Croft demonstrated that this is not a problem, at least as long as the character is acting in a role that men are comfortable with. Lara engages in tradition ally masculine activities, so men are happy to enter the game as Lara. They might be less comfortable with an avatar who engaged in more traditionally feminine activities. Women, of course, are expected to identify with male heroes routinely, a state of affairs predating computer games. Until recently, few books, movies, TV shows, or video games about adventurous activities featured female heroes, and they're still very much in the minority. Women justifiably get tired of playing male heroes, and they appreciate the opportunity to play as female characters

9.a. Explain Character dimensionality for defining characters of Video Games.

Characters may be classified into four groups: zero-, one-, two-, and three-dimensional. A character's degree of emotional sophistication and the ways in which his behavior changes in response to emotional changes determine his degree of dimensionality.

Zero-dimensional characters exhibit only discrete emotional states. A zero dimensional character may exhibit any number of such states, but there is no continuum of states; that is, the character's emotional state never moves smoothly from one state into another or shows evidence of being in two states at the same time; there is no such thing as "mixed feelings." The nameless orcs in The Lord of the Rings feel only two emotions: hate and fear. The orcs hate the heroes and attack. whenever they feel they outnumber their enemies, and they fear the heroes and run away whenever they feel

vulnerable or outnumbered. This minimal level of emotional variability is typical of the enemies in a simple shooter game. The emotional simplicity of zero-dimensional characters can make them comic.

One-dimensional characters have only a single variable to characterize a changing feeling or attitude; in other respects their character is largely fixed. In The Lord of the Rings, the dwarf Gimli is hostile and suspicious toward elves at first, but over time his respect for the elf Legolas grows until they are boon companions. His other attitudes don't change much. The movies make him a more one-dimensional character than the book does

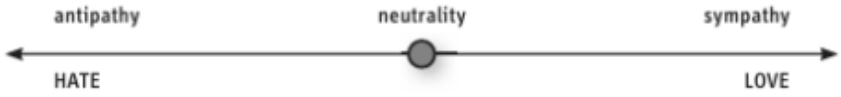


Figure 1 One-dimensional characters have a sin gle variable that describes an emotion that changes over time.

Two-dimensional characters are described by multiple variables that express their impulses, but those impulses don't conflict. Such variables are called orthogonal; that is, they describe completely different domains, which permits no emotional ambiguity. In The Lord of the Rings, Denethor is a two-dimensional character. He has a variety of strong emotions—pride, contempt, despair—but he never faces a moral dilemma. His senses of duty and tradition trump all other considerations, even when they are wildly inappropriate

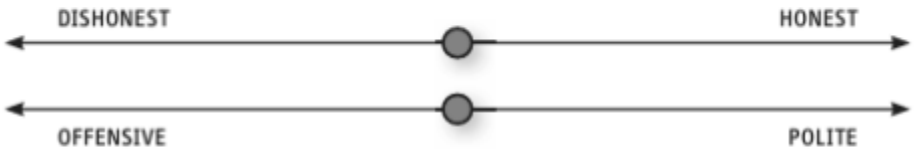


Figure 2 Two-dimensional characters have multi ple, non-conflicting impulses.

Three-dimensional characters have multiple emotional states that can produce conflicting impulses. This state of affairs distresses and confuses them, sometimes causing them to behave in inconsistent ways. Most of the major characters in The Lord of the Rings are three-dimensional, especially those who are tempted by the Ring. Frodo and, above all, Gollum are three-dimensional; Gollum's conflicting desires have driven him mad

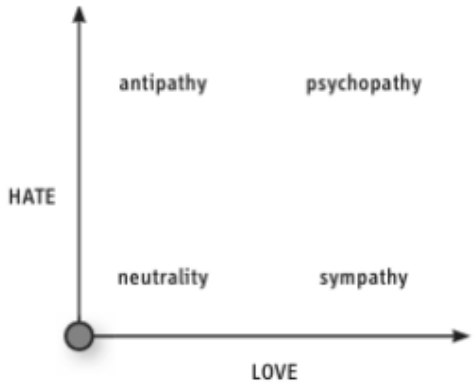


Figure 3 Three-dimensional characters can have conflicting impulses that produce inconsis tent behavior.

9.b. What is the need of storytelling engine? Explain in detail its role with diagram.

To design a game that includes a story, you must interweave the gameplay as the actions taken to overcome the game's challenge with the narrative events of the story. Narrative events must be interspersed among the gameplay events in such a way that all events feel related to each other and part of a single sequence that entertains the player. If the gameplay concerns exactly the same subject matter as the narrative and it should, in order to present a coherent and harmonious whole then the entire experience, play and narrative together, will feel like one continuous story.

Just as the core mechanics generate the gameplay, the storytelling engine manages the interweaving of narrative events into the game. The core mechanics oversee the player's progress through the game's challenges; the storytelling engine oversees the player's progress through the game's story. The storytelling engine and core mechanics must work together to create a single, seamless experience.

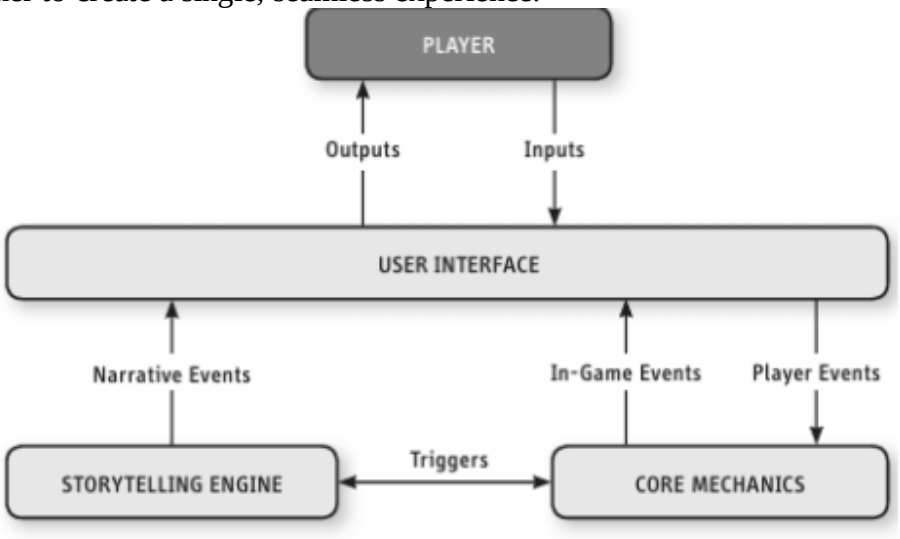


Figure 1 illustrates the relationship between the storytelling engine, core mechanics, user interface, and player.

An interactive story contains three types of events: player events, in-game events, and

narrative events. The core mechanics manage the player events and in-game events, as the figure shows. The storytelling engine manages the narrative events. However, the storytelling engine does more than just play movies or cut-scenes; it also keeps track of the progress of the story and determines what part of the plot should come next.

A double-headed arrow labeled Triggers connects the storytelling engine to the core mechanics.The core mechanics may determine that the interaction should stop and the storytelling engine should present some narrative for instance, when a player completes a level. The core mechanics send a message to the storytelling engine saying that the player finished the level and the storytelling engine should now display any interlevel narrative events. Likewise, the storytelling engine can send a trigger back to the core mechanics when a narrative event finishes (or when the player interrupts a narrative event), telling the core mechanics to resume play.

The storytelling engine doesn't sit idle during play, however. As the player progresses, the mechanics continually send triggers to the storytelling engine that way, the storytelling engine can keep up with what's going on. If, for example, the player makes a key decision that will affect the story later on, the core mechanics inform the storytelling engine of the decision.

Similarly, during play the storytelling engine can determine that the story has reached a critical plot point and trigger the core mechanics to cause changes to the internal economy of the game. Suppose the story says, "When the avatar reaches the bridge, he will be attacked by a highwayman in a cut-scene and robbed of all his property." The core mechanics, tracking the player's progress through the game world, send a message to the storytelling engine, "The avatar has reached the bridge."

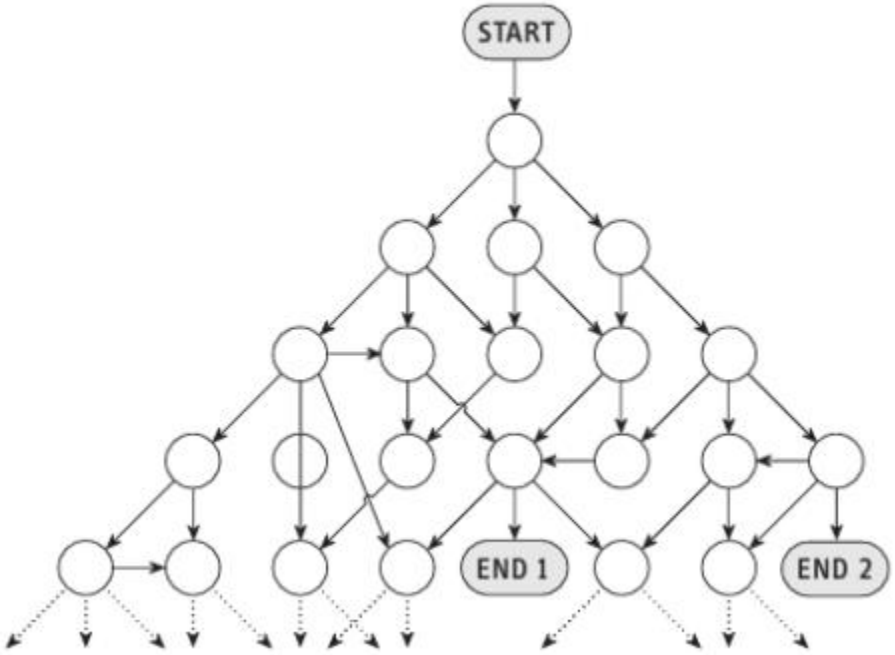
The storytelling engine detects that this is a key point, halts play, and displays a cut-scene showing the robbery. Then it transmits a message back to the core mechanics saying, "Transfer the avatar's inventory to the highwayman and resume play." Normally, the level designers do the work that actually implements such events in the game. Among the level designer's tools for level-building will be a mechanism

10.a. Define Branching story . Describe the branching story along with its disadvantages.

A branching story allows the player to have a different experience each time he plays the game. The story offers not one plot line but many that split off from each other at different points. As the designer, you decide on the different possible plot lines and how they relate to each other. During play, the storytelling engine keeps track of which plot line the player is following at any given time. When the story reaches a branch point a place where the current plot line subdivides the core mechanics must send a trigger to the storytelling engine to tell it which of the possible branches of the story the player will follow next.

Game events either player events or in-game events generated by the core mechanics (such as an action taken by an AI-driven NPC) determine which branch the story will take. Player events that influence the direction of the story fall into two categories: efforts to overcome a challenge or decisions that the story asks the player to make. Branch points connected with player decisions have one branch for each option that you offer to the player. Typically, branch points associated with challenges have only two branches leading on from the branch point, one for success and one for failure, though you can also create different numbers of branches for different degrees of success if you want to. We'll consider the emo

tional consequences of branches based on challenges versus those based on choices in the later section “Endings.”
If an event in the game causes the plot to branch right away, that event has an immediate influence on the story. This is the most common kind of branch and the easiest to implement. The player makes an irrevocable decision which road to take, for example and the story promptly reflects his choice. However, sometimes the player can make a decision early in the game that influ ences a branch point much later, in which case that decision has deferred influence, or he can make a whole series of decisions throughout the game that cumulatively affect a branch point, such that his actions and decisions, taken together, have cumulative influence.
A diagram of a branching story looks somewhat like a tree, although by convention the Root the beginning of the story appears at the top, so that the tree branches out as it goes down the page and the story goes forward in time. Figure shows a small part of the structure of a branching story.



The branch points don’t always have the same number of branches leading away from them. A story can branch in any number of directions at any given point.
■ The branches go down or sideways, but they never go back up again. The diagram depicts the possible progress of a story, and stories always move forward in time, never backward. In the course of playing a single game, the plot never follows the same branch or passes through the same branch point twice. This enforces the rule that stories must not contain identical repeating events and helps avoid the risk of continuity errors, as discussed earlier.
■ Unlike branches on a real tree, different branches can merge; that is, different plot lines can converge. Many branch points can be reached by more than one path.
■ The diagram depicts two possible endings that may be reached by different paths. The complete diagram would show additional endings farther down.

■ The diagram shows only one start point, but in fact a story could have several start points if the player made a key decision before the story actually began. The player might select one of several different characters to be his avatar, and that choice could determine where the story begins. Or the storytelling engine could choose from among several designated start points at random just to make the beginning different each time the player plays the game.The branching story mechanism is the classic method for creating interactive stories that give players lots of agency. Branching plot lines let you tell a story in which the player's actions strongly affect the plot, and he can see the effect of his actions if he plays the game more than once and makes different decisions the second time through.

10.b. Explain the emotional limits of interactive stories.

Video games that don't include a story, that is, games that primarily entertain via the challenge and achievement of gameplay, don't try to arouse complex emotions in their audiences. They limit themselves to the thrill of victory and the agony of defeat, or perhaps to the frustration of repeated failure. But with a story, you can create other kinds of feelings as well.

When you tell a nonlinear story, you give the player the freedom to make choices that significantly affect the relationships among the characters, which may include decisions that feel emotionally wrong or at least that don't conform to what you, as a storyteller, would like the player to do.

By offering the player the power to change the course of the story or at least to change the Ending you agree to accept the player's decisions, even decisions that are not ideal in ordinary

storytelling terms. You cannot guarantee that the player will experience the most emotionally powerful resolution you feel that your story offers unless you confine the player to a single resolution (and even then, the player may prefer a different ending because individual taste varies).

Designers often restrict otherwise nonlinear stories to a single ending simply to guarantee that the players experience the emotionally meaningful outcome the designer planned. That means that the player's agency before reaching the ending is merely an illusion. Players tolerate this in exchange for a satisfying ending, so long as you don't promise them that their choices will change an ending which, in fact, is fixed from the start.

Emotional Limits of Avatar-Based Games:

An avatar-based game is analogous to a story written in the first person. Reading a first-person story, the audience knows that regardless of what happens in the story, the narrator must have survived to write the story afterward. This isn't absolutely always the case the narrator in the novel Allan Quatermain, for instance, dies near the end and another character finishes telling the story but it does mean that whatever peril the narrator got into earlier in the book, you knew he would get out of it. As a result, first-person stories can't create quite as much concern for the life of the narrator as third-person stories can. A first-person story can have a depressing ending, but the narrating character cannot die prematurely.

A similar limitation applies to avatar-based games. Players know that an avatar should survive to the end of the game. Over the years, the avatar's premature death has come to signify the player's failure to meet a challenge rather than being an actual element of the story, so the death of the avatar carries almost no emotional impact. The player simply reloads the game and tries again

Party-based interaction models offer you more freedom to kill off members of the cast than avatar-based ones because the other members of the party remain to carry the story along. Two different television shows serve as good examples. The Fugitive could not have tolerated the death of Dr. Kimble, the hero of the show equivalent to the avatar in an avatar-based game.