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Student Name: Nischal Rai

London Met ID: 19031772

College ID: NP05CP4A190096

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First Supervisor: Er. Santosh Parajuli

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I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded

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1. Introduction

Game is a structured form of play that is usually played for fun or entertainment and is sometimes used as an educational tool. Games differ from work, which is usually paid, and art, which is often an expression of aesthetic or ideological elements [1]. According to Accenture, the total value of the gaming industry has surpassed the combined markets for movies, music and movies. The report, which is based on data collected by 4,000 gamers in four of the largest gaming markets, explores how the industry is shaping up and how it will continue to grow.

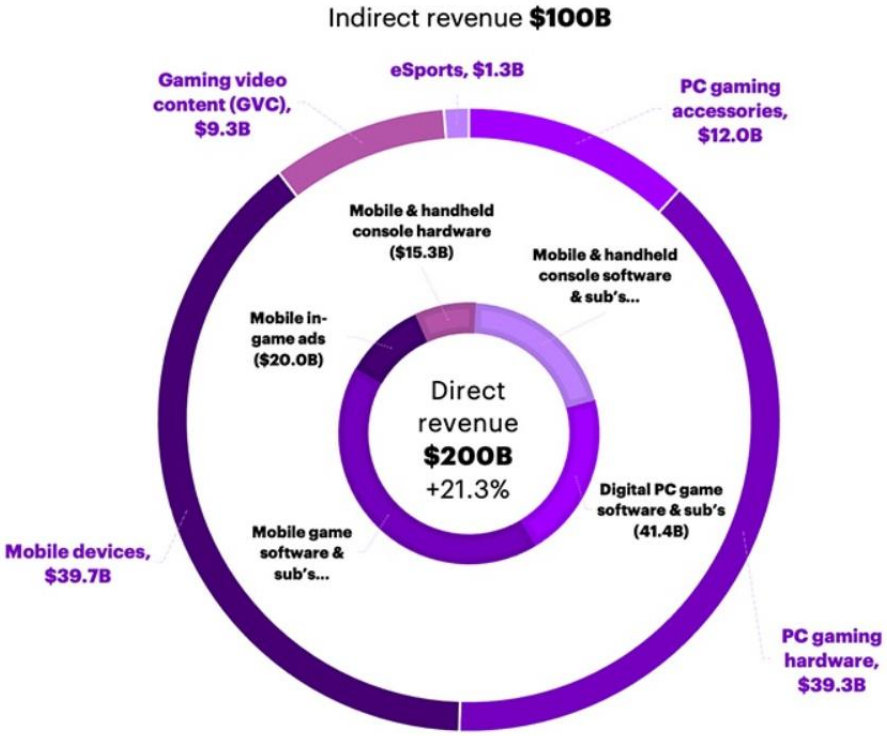


Figure 1: Current scenario of the game marketing

In the last three years, the gaming business has grown by half a billion players, totaling 2.7 billion people worldwide. More than 400 million new gamers are projected by the end of 2023, according to the report. The demographics of these newcomers are also shifting: 60% are women, 30% are under 25 years old, and one-third are non-white. Long-term gamers, on the other hand, are 61 percent male, 79 percent over 25 years old, and 76 percent Caucasian [2].

"The rise of new gaming platforms, combined with shifting demographics, is moving gaming organizations away from product-centric platforms and toward experience-oriented platforms," said Seth Schuler, managing director of Accenture's Software & Platforms market group. “The

business must strike a balance between the demands of gaming loyalists, who remain the company's most lucrative clients, and the needs of its newest users, who care more profoundly about their online interactions."

As the gaming community continues to grow, the social aspect is an increasingly key aspect to gamers' overall experiences. 84% of respondents say video games help them connect with others with similar interests, while three-quarters of them recognize that more of their social interactions now happen on gaming platforms. The study is based on information gathered from 4,000 consumers who spend at least four hours a week playing video games via an online poll. The sample is evenly split across four countries: China, Japan, the United States, and the United Kingdom. We also conducted over a dozen in-depth interviews with game executives from firms like as Activision Blizzard, EA, Everton, Niantic, Razer, Square Enix, Samsung, Splash Damage, and Tencent [3].

Educational games are ones that are either purposefully intended for the goal of education or those that are amusement games with educational value. Educational games are intended to aid in the understanding of concepts, the acquisition of domain knowledge, and the development of problem-solving abilities of those who play them. Almost half of all children spend more than 10 hours each day online, and by the age of twenty, they will have accumulated approximately 30,000 hours of gaming. Many educators have learnt to embrace high-tech methods of education, such as educational video games, game-based learning, and "blended learning," (the process of combining both technology and more traditional methods of teaching) rather than trying to distract children from the technology that is such an integral part of their lives. According to a 2013 study, games can improve learning results by two grade levels. Co-op is preferable. According to a study on motivation, when children play together, their outcomes improve by two standard deviations.

1.1 Problem scenario

The Covid-19 outbreak wreaked disruption on the educational scene, with campuses collapsing throughout the country practically immediately. In schools and universities follow a unique educational model in which students are unable to physically attend lessons but must instead attend classes digitally, posing a new difficulty. According to the study's findings, the majority of participants had internet troubles and lacked the knowledge to use and address technology-related issues.

Issues that arise during online classes. The contact between students in schools and colleges got difficult, and an effort was made to come up with strategies to solve basic problems that arose during online education.

Parents were having difficulty supervising their children, helping their children in their online studies, creating a learning place for their children, and so on due to the pandemic. Children were frequently preoccupied with other things and slacked off during online lessons during the pandemic, and children were preoccupied with online gaming and video games.

In the current context, many game companies are spending millions of USD to develop game. Many of the game company spend millions of USD, in game graphics, code, marketing, etc. which is nearly impossible in the context of Nepal. Youngsters are also spending huge amount of money just to play these games. Even if the game companies spend such amount of money in creating such game, gamers in Nepal won’t buy or spend money in games. They will just play crack game of other abroad company. In Nepal, it is very difficult to develop such type of huge game and spend on it.

1.2 Project as solution

We can entirely solve the existing situation by creating an educational game for children. As we all know, games are highly popular among children; therefore, including education into games can allow children to learn in an enjoyable way. There is a lot of useless stuff in games, but if we substitute education for the useless content, we can teach youngsters about educational issues through gaming content. Playing education games can help children not only in education but also in other things; playing game will help children to be good with hand-eye coordination, it will help in problem solving and strategy thinking skills, it helps do develop memory expand in youngsters, it also helps children who are suffering from attention disorder. Games, particularly those with simulation elements, outperform traditional learning by 23%. According to an excellent 2011 study, games are effective motivators, but they work best when learning is the enjoyable part, not just a side note. In the current situation, where parents complain that their children are distracted by games and are receiving lower grades in school, and where youngsters simply want to have fun while playing games, education games would, without a question, be the most effective answer in this type of circumstance.

To solve and reduce the risk of game development where company have to spend huge amount of money to make games, solo game development is the most effective way. In solo game development player won’t have to spend such amount of money in designing and graphics, player can use the available resources to develop a free game. Developer can earn money from the downloads count and from the ads played in game. In this way, we can develop game in Nepal as well and Nepali players will be able to play game developed by Nepali developer.

2. Aims and Objective

The project's major goal is to assist all parents and educators who are having difficulty educating their children and students, as well as to assist younger children in learning in their preferred manner. Only a few companies manufacture games in Nepal's present IT industry, and with this project, we can tackle two problems: the cost of producing games and the difficulty of youngsters studying in school.

Some objectives of this project are given below:

- To develop an educational game using unity C#, which enhanced the skills and knowledge in programming and game development.
- To understand how the game object works.
- To increase the thinking skills and creativity in game designing.
- To learn the implementation of unity engine.
- To understand the working mechanism of the unity engine and the implementation of physics in game objects.
- To be creative enough to put educational topics inside a fun game.
- To document the details of the creation and implementation of this game.

3. Expect outcome

This game is expected to provide the enjoyment to our players and well as help our player to learn within the part of enjoyment. This educational game will be underbudget and will be a great assistant to teacher and parents who wants their children to good in studies. This education game will be like a motivation to all the solo game developers in small countries like Nepal.

3.1 Project risk

As we all know that developing an education game is not an easy thing, there are many risks that we may face while developing an education game. Some of the project's risk are given below:

S.N.	Risk and Threats	Probability	Contingency
1	Many errors may be faced in the development phase	High	Must check the code properly
2	Failed to meet weekly deadline	Low	Follow the Gantt chart
3	Misplace of code and risk of getting it delete	High	Must keep backup code in drives
4	Hardware or Software failure	Medium	Must keep backup code and have required hardware
5	Include education in game	High	Must research well about the topic and game
6	Difficulty in code debugging	Medium	Effective research

Table 1: Project Risk

4. Methodology

A game is a type of software application that is designed to give amusement. When it comes to starting and creating games, merely following the software development life cycle (SDLC) isn't enough, because game developers encounter several obstacles during the production process. (Examples of difficulties include graphics, visuals, sounds, animations, physics, collisions, AI, gestures, and user inputs, among others). A new approach known as GDLC (Game Development Life Cycle) will be introduced to solve the difficulty that every game creator faces. To develop a strong software architecture for your game on all platforms, GDLC relies on common streamlined engineering concepts [4]. The game development process is extremely complicated and building a product for numerous platforms will always necessitate a collaborative multi-skilled/talented team. Game producers, game/art directors, a technical team, game designers, a game artwork team, a game quality team, a game programming team, a game testing team, and a game marketing (post-Production) team are all involved in the process [5].

To develop a successful game, any new gaming project should follow all the stages outlined in this image:

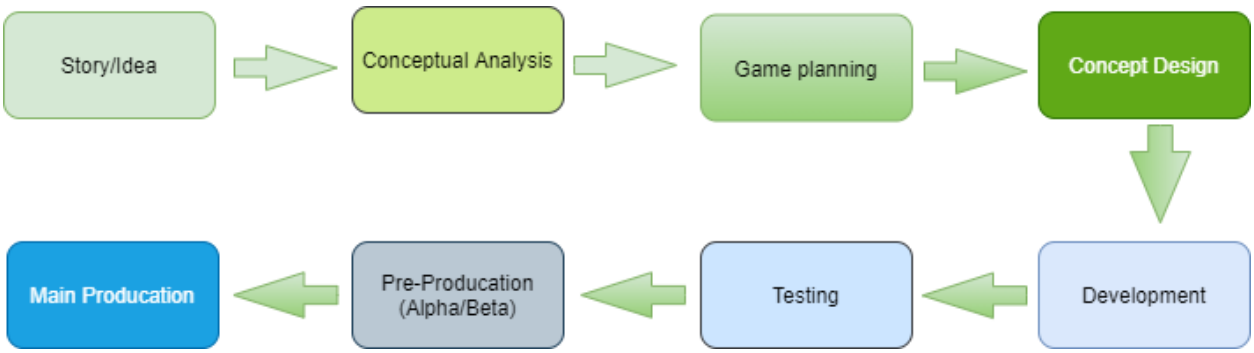


Figure 2: GDLC Chart

4.1 Story/Idea

The creators decide on the sort of game they want to make in the first stage, such as the target audience or players, the type of game, the hero, the protagonist of the game, the game's theme, and so on. The actual game concept and need of our project is the story/idea. All of this should be stated in the project/requirement document. Ideas are merely snatches of information from your game. It's the game's genuine prototype, which includes all of the concepts. Game Concept/Game Story refers to a collection of concepts.

4.2 Conceptual analysis

According to the story or concept, a thorough analysis of the need is required. Prior to beginning game production, a feasibility study should be completed. As a result, we'll need to look at a few areas.

- Actual Requirements
- Pricing
- Technical Capabilities
- Organizational, Cultural or Legal Issues and Solutions
- Skills and Scope of the project

4.3 Game planning

Following the collection of all needs and data from studies, game development planning is required. The game's project plan or blueprint must be created. On the paper or on a chart, write down all of the features, tasks, and ideas.

- Make a task list (graphics, animations, sounds, etc.)
- Scheduling and estimating the duration of each task
- Create a document/chart depicting the workflow
- Determine the workflow as well as the test cases and test strategies

4.4 Concept Designing

The term "concept design" refers to the creation of a design prototype for a certain demand, idea, or story. It is also known as "game design." The core of each game/product is the design. Game Design demonstrates mastery of the trade in bringing a concept to life. Any game's most inventive, creative, and complicated process. It is required in order to create decent and high-quality games. It necessitates critical interactive thinking, comprehension, implementation, execution, behavior, and user interface design. Before beginning production, the game designer must produce a document known as the "Game Design Document (GDD)" [6].

Game Design Elements:

- UI Interface
- Game Data
- Player Data & Characteristics
- Level Design
- Game play & Mechanism
- 3D/2D Game Arena
- Game Objects/Powers/Properties
- Sound Music

4.5 Development

Following the completion of the GDD, it is now time to begin developing the actual game concept/idea as described in the Game Design. The programming for the development should begin with the selection of the Game Engine and its supporting modules/plug-ins/frameworks/platforms. The lead programmer is responsible for the game's development progress and quality; lead programmer should create a checklist of pending, working, and finished tasks based on the developer's tasks. The work of each programmer/developer must be submitted to the main programmer.

Input and output data is straightforward for programmers, but dealing with art, graphics, collision, physics, and audio is more difficult. It's complicated since it requires scene/level management, AI, dynamic object spawning and destruction, loading and unloading resources, shaders, rendering, garbage collector handling, CPU&GPU use, game load, multi-platform support, advertising integration, and virtual goods implementations.

The Lead Developer/Developer should be knowledgeable about the coding system and its vocabulary.

- Abstraction
- Modularity
- Pattern of Design
- Architecture of Software and Games
- Structure and Style of Coding
- OOP skills
- Robust programming
- Use less resources & generate more output
- Feel end user experience

4.6 Testing

Testing is a reflection of finished product. The most crucial aspect of the GDLC is testing. In any game/concept development architecture, testing and game design are equally important. Testing is more than just playing a game at work or in the arena. It's about the real end-user experience with our product. It is a repeated and interactive process of receiving the same screen flow input and anticipating the user's response in terms of game quality.

While doing QA testing, it must work on two papers, one under the Bugs Tracker Report and the other under the Testing Report.

1. Documents for Test Cases
2. Documents for Test Plans

Every testing procedure must include certain papers and file systems:

- Defect/Bug
- Reproduce
- Module
- Frequency
- Bug Log Number
- Status/Occurrence
- Screenshots
- Platforms
- Date Time

Testing methodologies such as Functional Testing, Interruption Testing, Module Testing, Performance Testing, Load Testing, Memory Testing, Compatibility Testing, Compliance Testing, Behavior Testing, End User Experience Testing, and others must be completed.

4.7 Pre-Production (Alpha/Beta Release)

The art or positive indicator of a successful Manager/Director/Producer is pre-production method. Make careful to pre-produce any product before going into full production or releasing it. Must make the gaming product available for alpha/beta testing in order to identify and monitor real-time issues and user experience.

The Alpha/Beta Release is a wonderful approach to learn about user experience and acceptance of our product. If we made any problems after completing the testing phase, we may discover them using pre-production techniques before moving on with the main production. We need to produce a report for the Alpha/Beta Release's output; if rework is required, complete it for our product and ready it for Main Production/Main Release.

4.8 Main production

We need to prepare a short movie that looks like a trailer for our game and take some appealing screenshots during the creation stage. Finally, correctly deploy the game, press publish, and make it available in the relevant shops! We prepare a release note, privacy rules, and terms and conditions of use for our product, and include them in a well-organized main marketing document.

4.9 Resource Requirements

We all know that to complete a project or a system, we need a different type of resources. The following are the fundamental resources needed to complete this project:

- PC with windows 7 or above
- Unity 2019.4.29f1 (64-bit)
- Draw.io will be used to create a various of charts and figures
- Programming language: C#
- Knowledge about educational topic
- Adobe illustrator for game designing
- Microsoft Word for documenting the project

5. Work Breakdown Structure

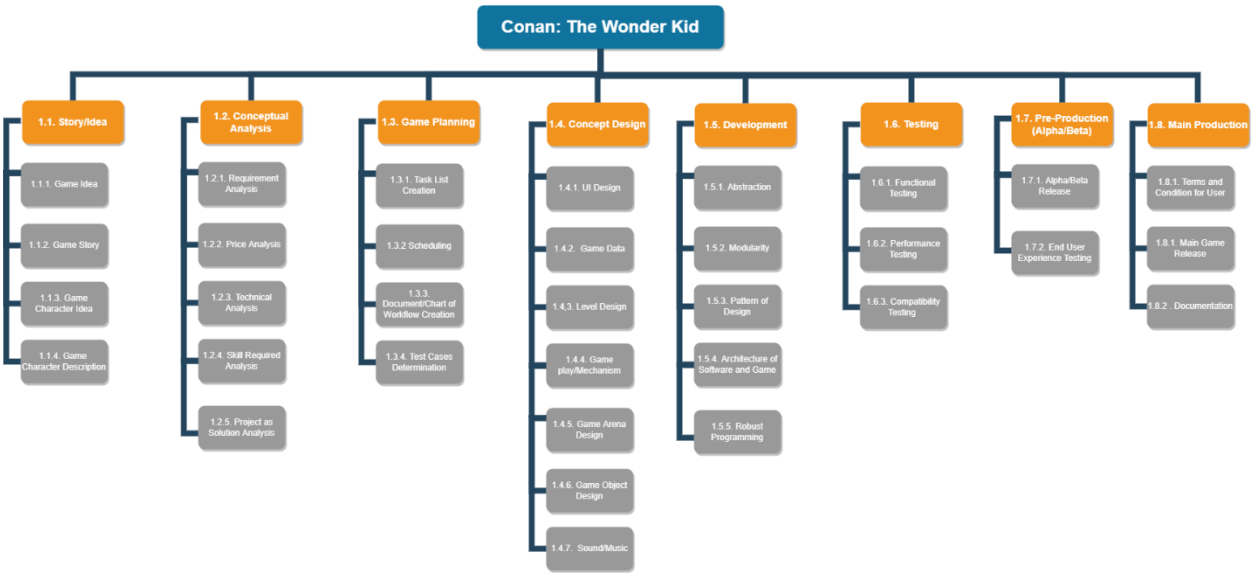


Figure 3: Work Breakdown Structure

6. Milestone

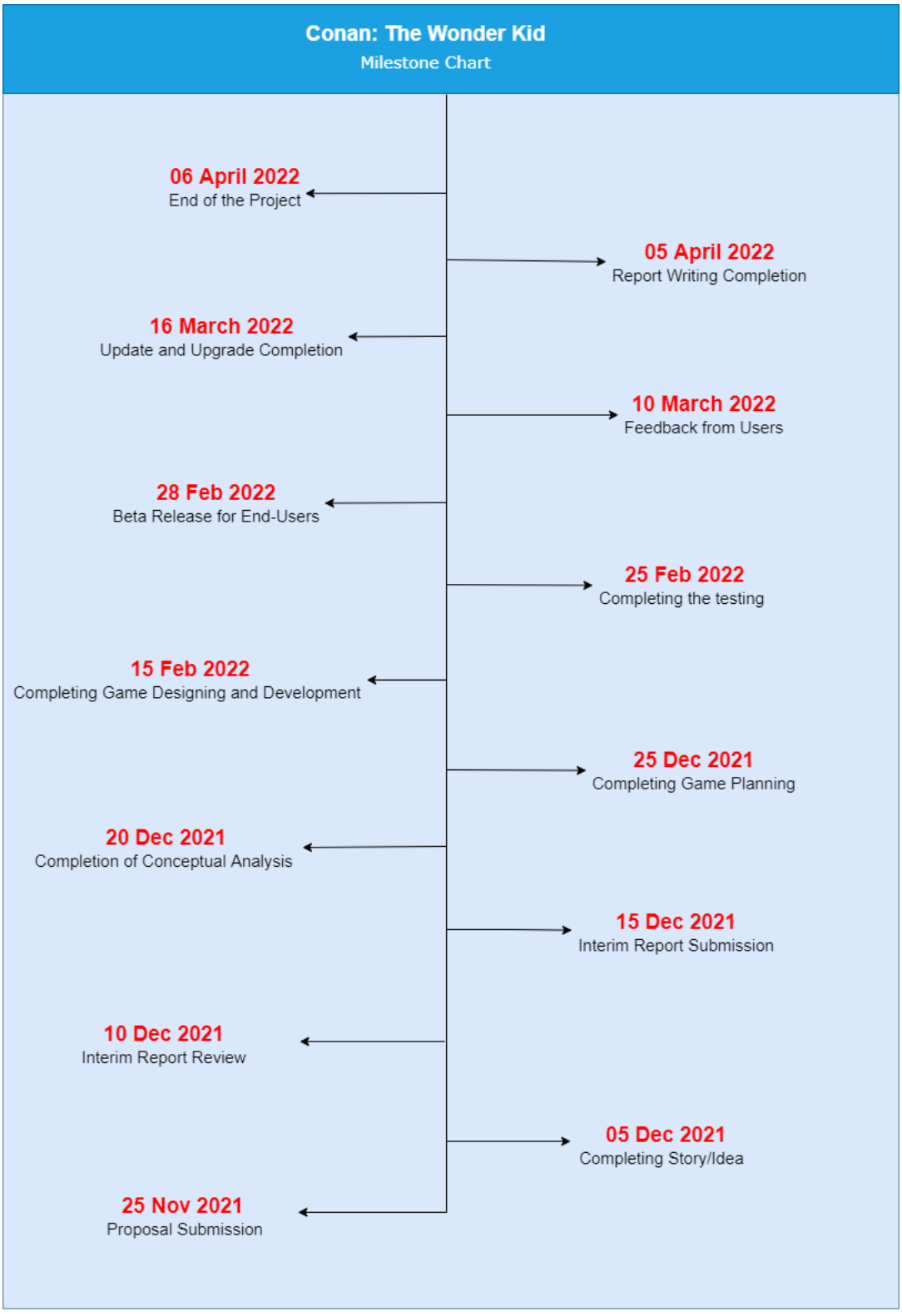
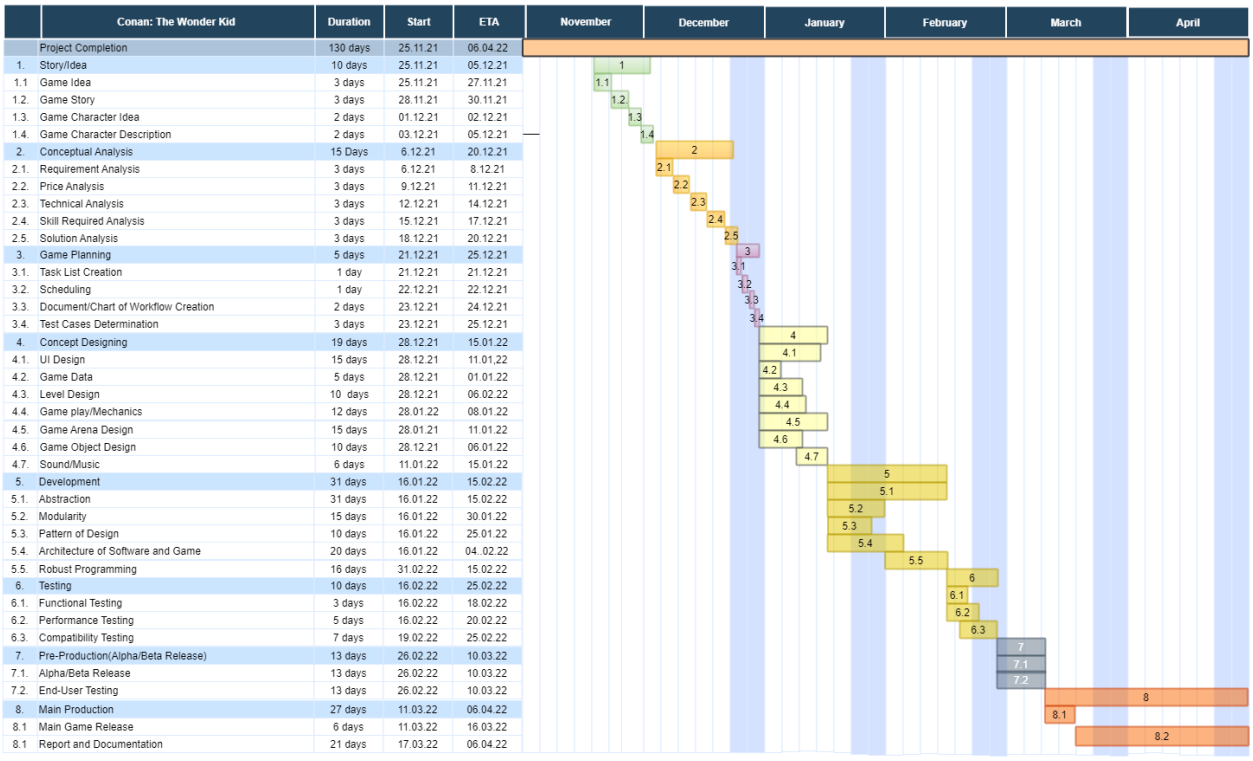


Figure 4: Milestone Chart

7. Gantt Chart



	Conan: The Wonder Kid	Duration	Start	ETA
	Project Completion	130 days	25.11.21	06.04.22
1.	Story/Idea	10 days	25.11.21	05.12.21
1.1	Game Idea	3 days	25.11.21	27.11.21
1.2.	Game Story	3 days	28.11.21	30.11.21
1.3.	Game Character Idea	2 days	01.12.21	02.12.21
1.4.	Game Character Description	2 days	03.12.21	05.12.21
2.	Conceptual Analysis	15 Days	6.12.21	20.12.21
2.1.	Requirement Analysis	3 days	6.12.21	8.12.21
2.2.	Price Analysis	3 days	9.12.21	11.12.21
2.3.	Technical Analysis	3 days	12.12.21	14.12.21
2.4.	Skill Required Analysis	3 days	15.12.21	17.12.21
2.5.	Solution Analysis	3 days	18.12.21	20.12.21
3.	Game Planning	5 days	21.12.21	25.12.21
3.1.	Task List Creation	1 day	21.12.21	21.12.21
3.2.	Scheduling	1 day	22.12.21	22.12.21
3.3.	Document/Chart of Workflow Creation	2 days	23.12.21	24.12.21
3.4.	Test Cases Determination	3 days	23.12.21	25.12.21
4.	Concept Designing	19 days	28.12.21	15.01.22
4.1.	UI Design	15 days	28.12.21	11.01.22
4.2.	Game Data	5 days	28.12.21	01.01.22
4.3.	Level Design	10 days	28.12.21	06.02.22
4.4.	Game play/Mechanics	12 days	28.01.22	08.01.22
4.5.	Game Arena Design	15 days	28.01.21	11.01.22
4.6.	Game Object Design	10 days	28.12.21	06.01.22
4.7.	Sound/Music	6 days	11.01.22	15.01.22
5.	Development	31 days	16.01.22	15.02.22
5.1.	Abstraction	31 days	16.01.22	15.02.22
5.2.	Modularity	15 days	16.01.22	30.01.22
5.3.	Pattern of Design	10 days	16.01.22	25.01.22
5.4.	Architecture of Software and Game	20 days	16.01.22	04..02.22
5.5.	Robust Programming	16 days	31.02.22	15.02.22
6.	Testing	10 days	16.02.22	25.02.22
6.1.	Functional Testing	3 days	16.02.22	18.02.22
6.2.	Performance Testing	5 days	16.02.22	20.02.22
6.3.	Compatibility Testing	7 days	19.02.22	25.02.22
7.	Pre-Production(Alpha/Beta Release)	13 days	26.02.22	10.03.22
7.1.	Alpha/Beta Release	13 days	26.02.22	10.03.22
7.2.	End-User Testing	13 days	26.02.22	10.03.22
8.	Main Production	27 days	11.03.22	06.04.22
8.1	Main Game Release	6 days	11.03.22	16.03.22
8.1	Report and Documentation	21 days	17.03.22	06.04.22

Figure 5: Gantt Chart

The Gantt chart is a graphical depiction of the project's tasks along a timeline. It tells us when a work begins and how long it will last. The whole project is completed in 130 days. The Division of the work is done in 8 parts: Story/Idea, Conceptual Analysis, Game Planning, Concept Designing, Development, Testing, Pre-Production (Alpha/Beta) and Main Production. In the left-hand side, the detailing about the work division of the Project is given and in the right-hand side, its chart is given. Indeed, this Gantt chart is easy to understand and very helpful in work division in this type of Project.

8. Conclusion

In the context of Nepal, creating an education game is very important, it can solve the problem of teachers as well as parents. Video games are a type of media that is frequently linked to detrimental health effects. Games, on the other hand, may be a useful source of stress release as well as a catalyst for mental health improvement and the development of social skills when played in moderation and with mindfulness. Video games are a relatively new kind of entertainment in their own right. They engage and immerse you in a way that traditional board games and other types of entertainment do not. The player actively adds to the degree of enjoyment he or she derives from this medium, making him or her more involved and eager to participate in the video game's aspects. Gaming's impacts are also influenced by the quantity of time spent playing. Excessive playing can be harmful, but gaming in moderation can be healthy, enjoyable, and educational. By including education inside the game, we can reduce the risk of loss of time and also utilized the time of youngsters who play games to procrastinate.

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