

## Strategic Tower Defence Game

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### ABSTRACT

This research is based on intelligent strategy game known as Tower Defence in which players have to make strategic decisions to defend their tower from their enemies.

This an interesting game where people can test their wits. In this game the players can build and upgrade their tower to prevent higher damage from enemies.

This game requires quick strategic decisions and is fun to play. There are wide array of weapons/equipments that the player can access by using earning points.

This game is developed by using Unity platform using C#.

This game is easy and understandable as compare to other tower defence games available in market and can be played by players of all age. This intelligent strategy game is highly competitive and will help sharpen your brain too.

**Keywords**— Defence Game, C#, Tower, Independent Game

- To make the game more interesting and knowledgeable for the user.

## II. LITERATURE SURVEY

### 2.1 Study of the Strategic Tower Defence Game

Between 2007 and 2008, the genre became a phenomenon, due in part to the popularity of the tower defence mode in real time strategy games, but mainly due to the rise of Adobe Flash independent developers as well as the emergence of major smartphone app stores from Apple and Google. The first standalone browser games emerged in 2007. Among them were the extremely popular titles Flash Element Tower Defence released in January, Desktop Tower Defence released in March and Ant buster released in May. Desktop *Tower Defence* earned an Independent Games Festival award,<sup>1</sup> and its success led to a version created for the mobile phone by a different developer. Another significant Flash title released in 2008 was Gem Craft.<sup>4</sup> Handheld game console were not ignored in the boom and titles included Lock'sQuest and Ninja town released in September and October respectively.<sup>4</sup> Tower Defence was first published in 2007, one of many in a series of balloon themed multi-platform games released.[8]

By the end of the boom, most tower defence games were still stuck in the side scrolling, isometric, or top-down perspective graphical medium. Iron Grip: Warlord, released in November, 2008 unsuccessfully pioneered the first person perspective shooter with the genre. The awkward combination of experimental tower defence mechanics with 3D graphics was not well received, but later titles refined its execution paving the way for a popular new breed of games. Dungeon Defenders, released in October 2010, was one of the first tower defence games to bring the genre to the third person perspective. It sold over 250,000 copies in first two weeks of release and over 600,000 copies by the end of 2011. 2010 saw the release of Steam World Tower defence, Protect Me Knight, The Tales of Bears worth Manor,

## I. INTRODUCTION

### 1.1 Introduction

Game Development was first introduced in October 1958 by Physicist William Higinbotham when he created a game which was thought to be the first video game.

Nowadays games are played by so many people ,in fact many youngsters have also chosen it as their career. One of the main advantages of investing time in playing games are that they can help us to increase our concentration power .

### 1.2 Aim/Objective

- The core objectives of this game are as follows:-
- To develop an interactive tower defence game with UNITY and C#.
- To make the game available for mobile and PC both.
- To make the user interface more friendly and also easy for playing .
- To make the game of less than 200Mb memory.

Revenge of the Titans, Arrow of Laputa, Toy Soldiers and Robo calypse: Beaver Defence.[8]

## 2.2 Summary Based on Comparison

### i. Comparison Based on Platform

The java based game clash of clans Comparison on the basis of platform is available only in mobile platform. It can also be played in PC but it is available only in online mode. Also for one to play this game on mobile he/she should have a good WIFI connection also playing this game on mobile data will make it too laggy which will irritate the user

Often while playing. The flash element TD game which is a web based game which is available in only PC mode which also we have to play it in online mode. This is the biggest disadvantages of this as compared to our. But this is not the case with our strategic tower defence game it will be available for both mobile and PC and will only be available in offline ,which in no doubt most of the game lovers prefer and want the game to be in. So the issue of network connection problem server problem will not be faced by any of the user. Which Will also make the user more addictive towards it.[9]

### ii. Comparison on GUI Modal

The clash of clans game is build using 2d engine, one disadvantages of using this kind of platforms is that it does not offer much better graphics quality. This game corelly focus on the game play and different types of weapons/guns available for upgrading or buying.

But the one main thing that the developers of this game focused too much on was user interface Thus due to which they ended making a pretty much complex UI. As we all know the user interface is one of the most key element of any game Because that is the main factor that keeps the user investing.

Their time on it. Thus due to presence of complex UI this game fails to keep its user investing their time on it. Also due to complex UI users would have to invest extra time in understanding the gameplay. Also if you want to achieve success in this Game you need to invest time by watching the youtube gameplay tutorials of pro players. Talking about flash element TD game is a game which is made by using WebGL, HTML5, JavaScript which conclude that its completely a web based game . Since WebGL is API which only supports Chrome, Firefox, Internet explorer, etc .[9]

### iii. Comparison on Game Play

In clash of clans as you can see from the above screenshot a time limit is applied which forces the user to complete a particular level before the time The user has to save their crops, garden, etc from the enemies troops. Thus the troops of the enemies are destroyed by the below available characters.

Talking about the gameplay of our game, being a tower defence game it has same gameplay as mentioned above for the clash of clans.

But things that make our strategic TD game separate from other games are as follows, When the user is attacking any incoming enemy at the top of the enemies of the enemy its health bar will be shown which will make the user more easy to kill the enemy.[9]

## III. EXISTING SYSTEM

### 3.1 Plants vs. Zombies 2

Plants vs. Zombies 2 (formerly known as Plants vs. Zombies 2: It's About Time) is a 2013 free-to-play tower defence video game developed by Pop Cap Games. Unlike other tower defence titles, Plants vs. Zombies pits users against on coming zombies with nothing more than just a couple of young plants. Size of the app: around 637 MB (varies depending on device). Compatibility is Android 4.1 or higher[2]

### 3.2 Clash of Clans

Clash of Clans is a freemium mobile strategy video game developed and published by Finnish game developer Supercell The game is set in a fantasy themed persistent world where the player is a chief of a village. Players can conjoin to create clan groups of up to fifty people who can then participate in Clan Wars together, donate and receive troops, and chat with each other. The big hype around Clash of Clans probably didn't pass anyone by.

However, this is less of a tower defence game and more of a village defence game.[3]

### 3.3 Flash Element TD

Flash Element is a freemium real-time strategy video game developed and published by Supercell. It is a tower rush video game which pits players in games featuring two or four players (1v1 or 2v2) in which the objective is to destroy the most opposing towers.

Features are Dual players from around the world in real-time and take their

Trophies. Construct your ultimate Battle Deck to defeat your opponents.[1]

## IV. PROPOSED SYSTEM

This is a tower defence game that will focus on excellent multiplayer, though there will also be a well develop campaign. There are a large number of innovations within the tower defence genre, some new to games as a whole and some pulled from other game genres.

Some of the major innovations are as follows: One of major problems with tower defence games involves quickly overpowering content; the player gets bored as the

game takes five or six turns to catch up with player’s progress.

A new dynamic difficulty system will be implemented where the engine automatically scales the difficulty of the content depending on how well the player does. Another area of concern in traditional tower defence games concerns the resource system, where resources are gathered via killing enemies.

This has issues in multiplayer (particularly where one player grows more and more powerful until they are the only one that can kill enemies). An economic system where the player manages an economy is proposed.

This additionally gives the player more to do when killing waves. Significant strategic depth is provided through the effect system, which allows for “effects”, such as burning or freezing, to be applied to entities.

High level benefits of this system include simple parallelization, removal of the update order problem, and removal of event dispatching.

### V. HARDWARE AND SOFTWARE REQUIREMENTS

Sr no.		Minimum System Requirements	Recommended System Requirements
1	Memory	2 GB	6 GB
2	Graphics Card	NVIDIA GETFORCE 6200 or AMD RADEON 9550	NVIDIA GETFORCE GTX or RADEON HD 6750
3	CPU	INTEL PENTIUM 1500MHZ OR AMD A10 PRO-78008 APU	INTEL CELRON G1101@ 2.27GHZ OR AMD A4 5300B APU
4	OS	WINDOWS VISTA,7/8/10	WINDOWS VISTA,7/8/10

### VI. DESIGN

The game starts with level 1. The player in the game has some initial points (thunder points /game

points=20) and initial lives (lifeline =10) and damage is initialized to 0.In addition to this, the player has access of three different types of weapons which can be purchased using thunderpoints.



The player in the games has some initial points (thunder points /game points=20) and the initial lives (lifeline =10) and damage is initialized to 0.The wave generator module generates the enemy waves . We have to place the tower in appropriate place to stop the enemies .

The towers are to be placed such that the enemies are killed as early as possible .The player has to also manage the number of towers, the number of game points and the strategy. The game points needed for a weapon and the damage produced by the weapon are as follows:

Assault Cannon (fire)	thunder points=13	Damage produced=20
Plasma lance (fire)	thunder points=22	Damage produced=40
Rocket Platform (fire)	thunder points=50	Damage produced=60
Missile array (fire)	thunder points=20	Damage=35
EMP Generator(fire)	thunder points=6	Damage=15

During the gameplay if the enemies get killed then the thunder points increase by 20 and if the enemies reach the end points then the thunder points decrease by 20 and life reduces by 1. If all the lives are over then the player has to play the level again or else if the player survives all enemy waves before all lives get over then the player is declared winner.

### VII. CONCLUSION

The Tower Defence game that we have designed enables players to choose the level based on their potential. Each level has its own set of challenging enemies. We have created a game which is balanced and challenging for both new and advanced players. We have used lives, health and skill points which affects the difficulty of the game.

**Level 1** shows the starting arena where the player has three different weapons.

**Level 2** introduces a new arena with increased difficulty.

For future work we are planning to create a model where the player can only access the higher levels by completing each lower level one by one.

Moreover we are planning to adjust several attributes to make the game easier for the novice players.

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### REFERENCES

[1] Jay. (2007). Flash element TD. *Jayis Games*.  
 [2] Ambrozy, Brian. (2009). Plants vs. Zombies nominated for PC game of the year. *Icronic*.  
 [3] Andrews, Jason. (2012). *Dungeon defenders exceeds more than a quarter of a million in sales*. Available at: ThisisxBox.com.  
 [4] [https://www.youtube.com/results?search\\_query=tower+defense+game+using+unity](https://www.youtube.com/results?search_query=tower+defense+game+using+unity).  
 [5] <https://github.com/Brackeys/Tower-Defense-Tutorial>.  
 [6] <https://www.edopedia.com/blog/open-source-html5-and-javascript-games/>.  
 [7] <https://unity.com/>.  
 [8] <https://wikipedia.com>.  
 [9] IEEE Paper.