Designing and implementing a 3D puzzle-solving game

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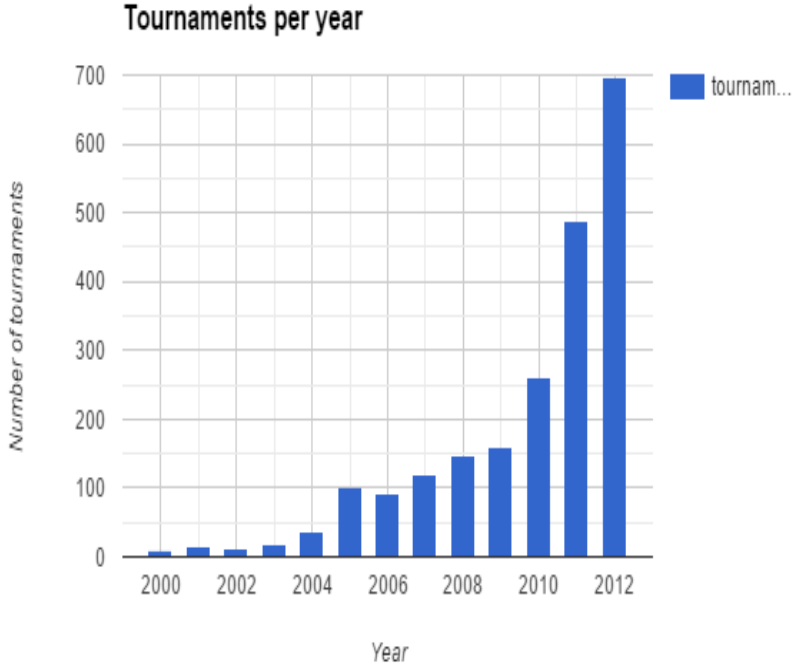
Why is making a game relevant?

- Game development has become a major source of income for many countries
- Playing games has become a profession for many people.
- One of the most popular services for this is Twitch.tv

Twitch.tv

- Twitch is the official platform for people to play live online for other people to watch
- It is also the official streaming service for eSports tournaments
- Such tournaments have seen incredible growth both in number and prize pool per year


Tournaments per year
Number of tournaments
700
600
500
400
300
200
100
0
2000
2002
2004
2006
2008
2010
2012
Year
tournam...


Annual prize money for tournaments
Prize Money
10,500,000.00
9,000,000.00
7,500,000.00
6,000,000.00
4,500,000.00
3,000,000.00
1,500,000.00
0.00
2000
2002
2004
2006
2008
2010
2012
Year
prize money(US dollars)

Why is making this game relevant?

- Puzzle games have enjoyed moderate success, with the best one - Portal, still being considered as one of the best games made in the last 10 years.
- There are not many games released to date that use puzzle solving in 3D space as the main focus.
- Such games are also easy to pick up and suitable for dispersed short bursts of playtime - this makes them suitable for casual players as well as more dedicated ones.

What is my game?

- It is a 3D game where the player needs to solve multiple puzzles in order to progress
- After each puzzle the player is rewarded with a piece of information regarding the character they play or the world they are in
- The player is a forest wisp which has two super powers
- Using SP1 the wisp can fly, push heavy objects, reveal trick walls and go through some of them
- Using SP2 it can send a light Probe to light up the way or it can also Blink to the position of the Probe

Main challenges

- Creating the overall design - this covers everything from gameplay mechanics to style and atmosphere
- Gameplay mechanics - how the game is played(super powers, movement, puzzles)
- Style and atmosphere - how everything is presented to the player(sounds, colours, environment)

Main design challenges

- Designing SP1 and SP2
- Designing puzzle types

Designing SP1 and SP2

- What is the purpose of each?
  - Is it well defined?
  - Do they have more than one application?
- How are they different from each other?
- Do they feel equally useful?
  - Is there a chance the player would disregard one in favour for the other?
- Are they simple to understand and use?

Designing puzzles

- Which super power is required for this puzzle?
  - Is this clear to the player?
- Is the solution for the puzzle intuitive?
  - This does not mean easy, rather - is it sensible?
- Is the puzzle enjoyable?
  - Does it feel tedious completing it after having come up with the solution?

Main implementation challenges

- Sliding down slopes
- Trick walls
- Making changes on character model more visible

Trouble sliding down steep slopes

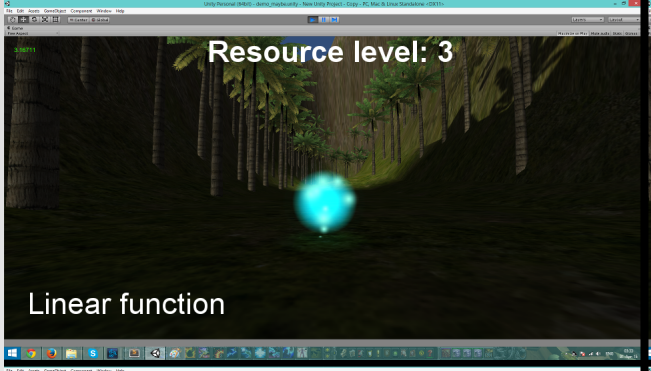
- By default there is no such functionality
- Displacing the character by applying force when using CharacterController gets overwritten
- Moving the character without a CharacterController felt bad and unenjoyable
- Using the normal of the surface of the slope causes jagged “falling” rather than a smooth slide

Implementing trick walls

- Problems with initial design
  - No replayability value
  - Only one type of trick walls
- Problems with new design
  - Keep the element of surprise and uncertainty
  - Only affect walls that are close to the player

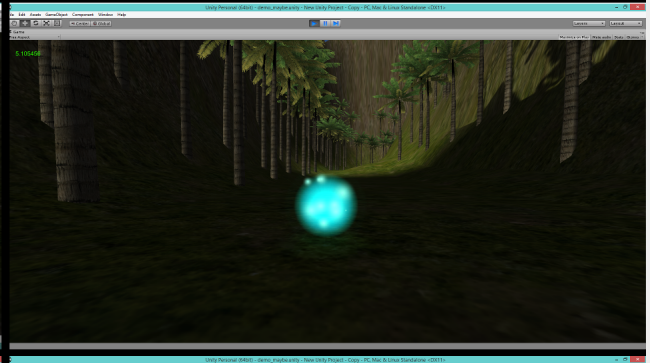
Making changes on character model more visible

- First model did not relay enough information to player
- Changing the character model in a linear fashion based on character resource is not noticeable
  - Each change is small and barely visible
- Changing the properties of the model based on a curve
  - Previous experience has taught me this has good effect
  - Linear function versus Quadratic and Cubic functions

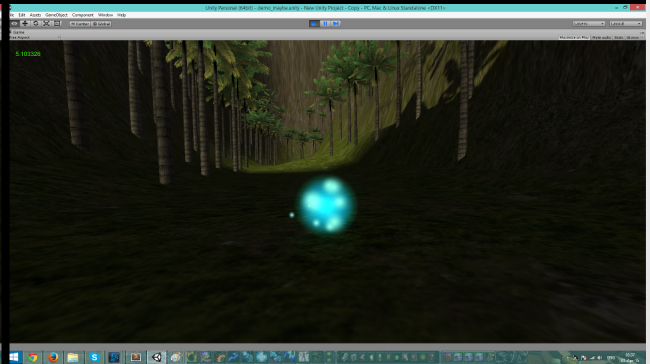

Resource level: 3
Linear function


Resource level: 5


Quadratic function




Cubic function



In conclusion

- Designing this game was interesting and incredibly educational for me
- It gave me a first hand look into the roles of the many different people that work on a single product
- Many of my biggest challenges involved taking design decisions which would shape the game