

# RENDEZVOUS

*A Strategy game using OpenGL*

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*by*

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# Certificate

This is to certify that the CSP701 project report titled **RENDEZVOUS** being submitted by **Abhishek Agarwal & Harinder Pal** is a record of bona fide work carried out by them under my guidance and supervision at the **Department of Computer Science & Engineering**. The work presented in the report has not been submitted elsewhere either in part or full, for the award of any other degree or diploma.

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# Abstract

The following describes the strategy game **RENDEZVOUS** we implemented in C++ using OpenGL as part of CSP701 assignment 3. The game revolves around two teams located on diagonally opposite sides of a map aiming to destroy each others temple. Each team will have two players protecting the teams temple. Stating the obvious the team first to destroy the enemy temple wins.

## Acknowledgments

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**Abhishek Agarwal**

**Harinder Pal**

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# Chapter 1

## Introduction

### 1.1 Outline of the game

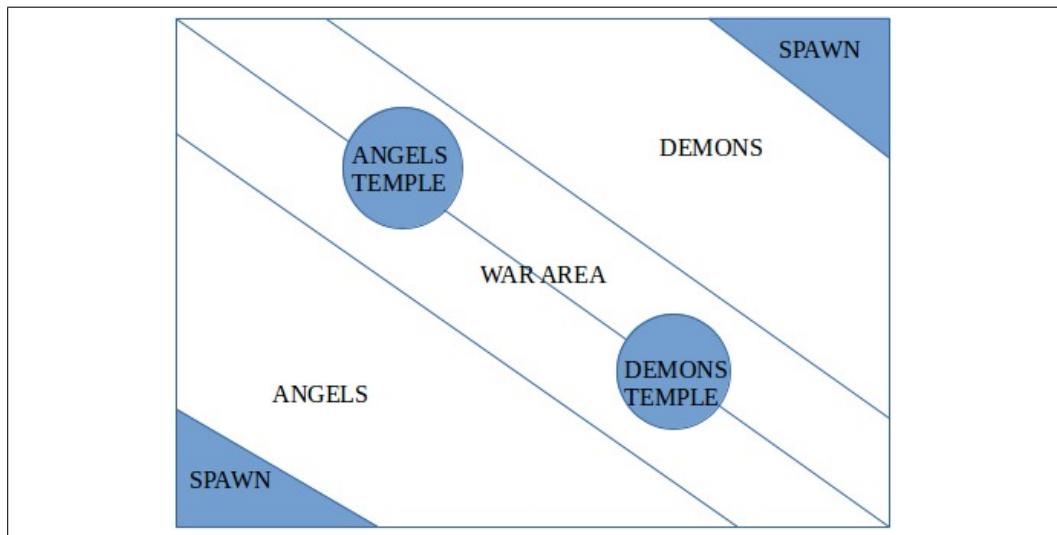


Figure 1.1: Bare outline of the map

1. Our game revolves around two teams Angels and Demons.
2. Each team will have its own team area on either side of the diagonal as shown in Figure. 1. The other team is not allowed to enter this area.
3. There is a common war area around the diagonal that both teams are allowed to enter.
4. The common war area around the diagonal will also have strategically located temples for each team.
5. There are 2 players per team. Therefore in total four players are allowed in MultiPlayer mode of the game.
6. The enemy team's team area is never visible.

7. The team's health is represented by the temple's health in the game. Destroying the enemy's temple means reducing enemy temple's health to zero.
8. Each player is assigned a hero. Each hero has his own health. Killing a hero means reducing it's health to zero. A hero is reborn after death in the teams spawn area.
9. A team's temple health is considerably greater than it's individual hero's health.
10. The team area and war area will have obstacles(stones/trees) located. The hero will have to find paths around these obstacles to their target locations.
11. Each hero is allowed to move in horizontal and vertical direction. Once a target location is identified, the hero will use A\* to reach the destination based on above restrictions.
12. The hero while traversing can pick certain items which add to its capabilities. The items are further described in the document.
13. Each hero will have a basic attacking capability and a magic power. Thus, each hero will have two modes of attack : Basic mode and Magic mode. Heros are further described in the document.
14. Each team will have it's own spawn area. A hero when born/re-born will find itself in this spawn area. Hero's can refuel their health by traversing back to this spawn area.

## 1.2 Play Modes

We plan to offer two play modes for the end user. One being the **Bot Mode**, and other being the **MultiPlayer Mode**. In the **Bot Mode**, there will be one player with three AI players. The **MultiPlayer Mode** will allow four players on different nodes to play together, two players on each team.

# Chapter 2

## Screenshots

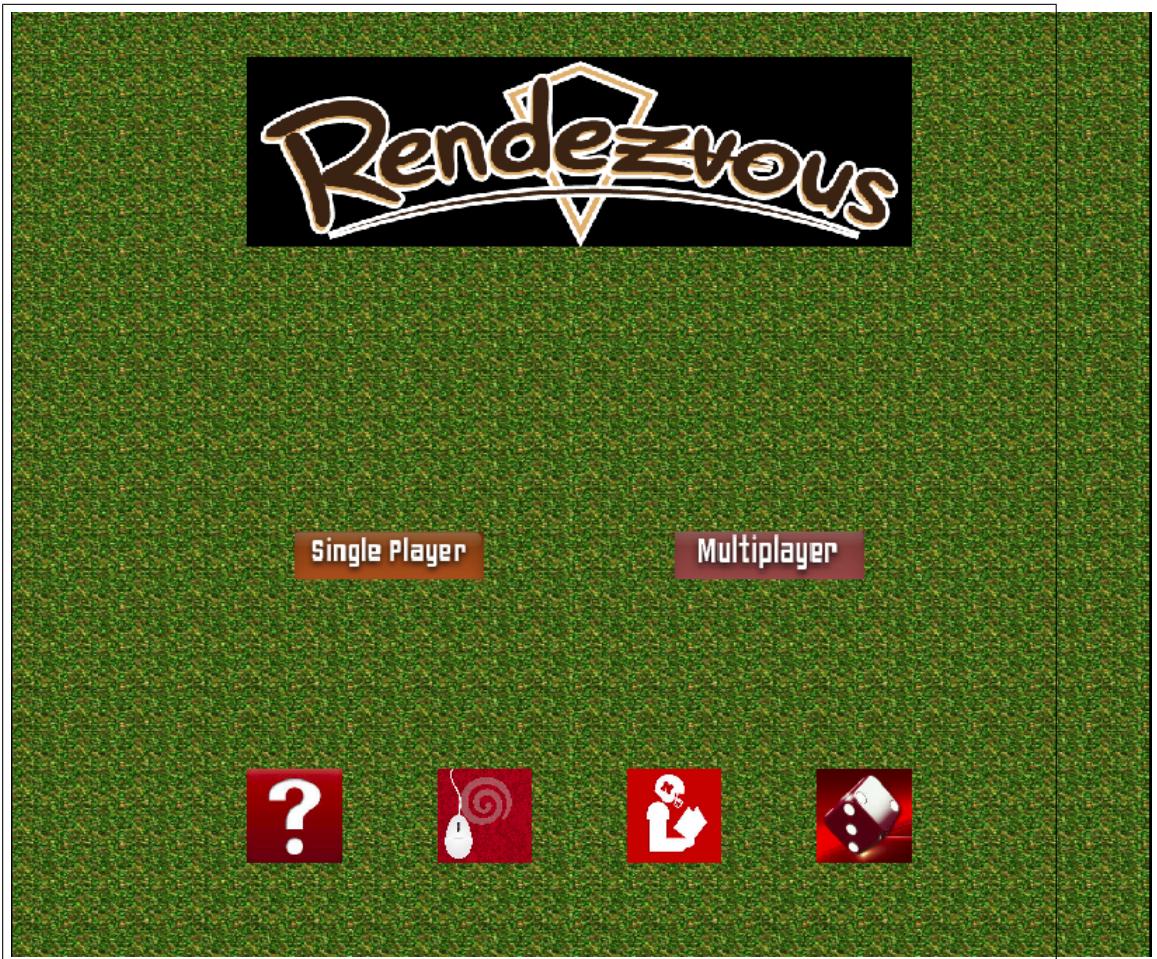


Figure 2.1: Rendezvous

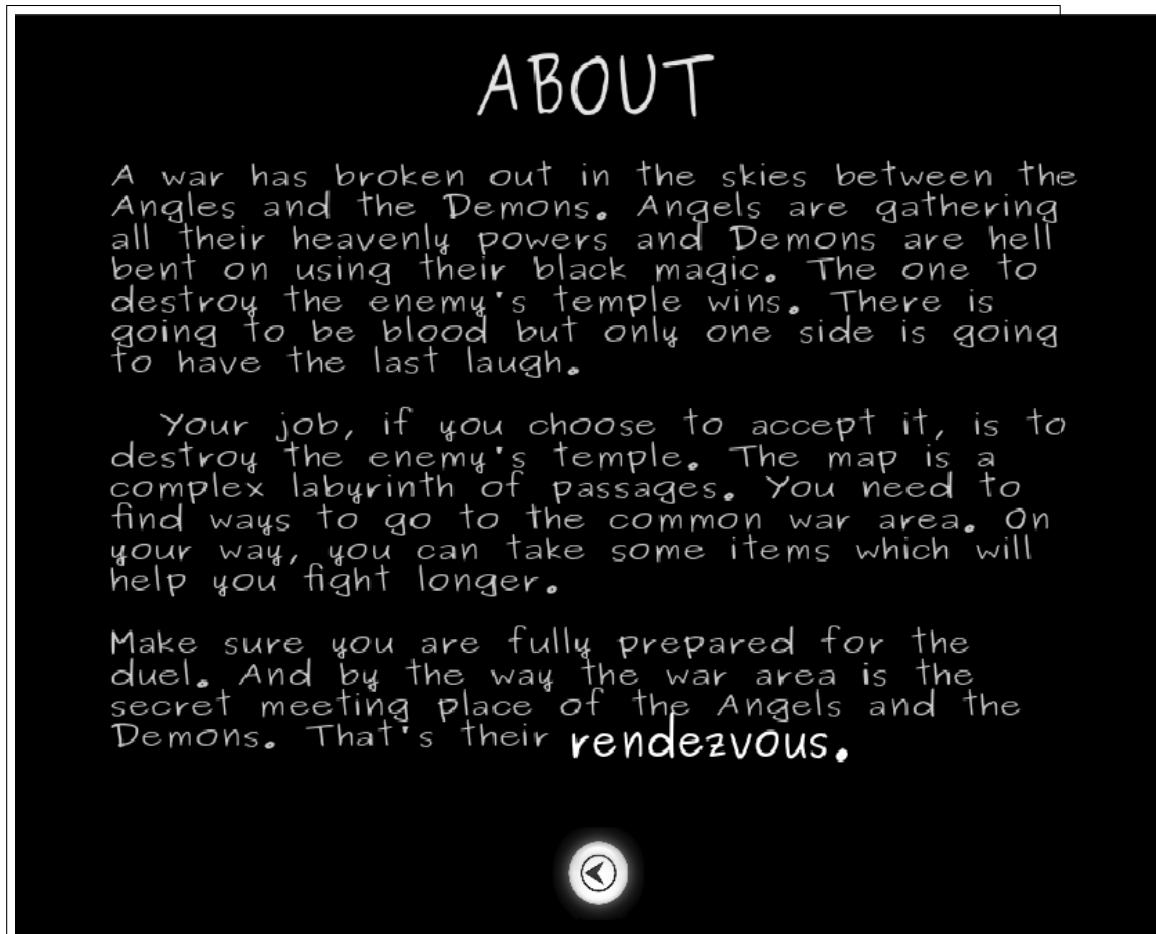


Figure 2.2: About Game

## ABOUT PLAYERS

	<b>DISABLER</b>	Disables the enemy player from using any magic power by attacking in its magic mode.
	<b>BURSTER</b>	Does serious damage to the health of the temple/hero by attacking in its magic mode.
	<b>STUNNER</b>	Disallow the enemy player from attacking anything. And also slows its speed by a stunning factor!
	<b>SLOWER</b>	Reduces the attacking strength of the enemy player significantly by attacking in its magic mode.



Figure 2.3: About Heroes

## RULES

1. You can not see enemy's side. Only your side and war area is visible.
2. You can take an item if it comes across in your path. You can not then take immediately another item till a certain time.
3. Once you die, you are reborn in your spawn location, but can only play after some time.
4. In need of immediate health, run to your spawn location, your health will be refueled.
5. There are 2 players per team. Destroying the enemy's temple means reducing enemy temple's health to zero.
6. Each hero will have a magic power which can be applied once in a while on enemy player. The magic power can then not be immediately used till a certain time.



Figure 2.4: Rules of the game

## CONTROLS

1. MOTION: Right Click on grass or war area to move to that location by finding a path automatically.
2. ITEMS: Right click an item to move to that item and pick it. Anyhow, if you are moving over an item you will pick it if the item timer allows it. A random item is always placed on your side.
3. ATTACK: Left click on the enemy player or their temple to move to their location and attack.
4. MAGIC MODE: switch to magic mode by pressing 1 if the magic timer is not on. switch to basic mode by pressing 2.
5. AI PAUSE: Press 'p' in single-player mode to pause AI bots.
6. TOGGLE FRIEND'S AI: Press 'q' to toggle your friend AI-bot's mode between Offensive(attacking only temple) and Normal.
7. MUSIC: Press space-bar to toggle music.
8. EXIT: Press 'Esc'.



Figure 2.5: Controls

# Chapter 3

## Map Details

### 3.1 Schematic Map Representation

We have internally divided our map area into a grid of 20 by 20. Consider the schematic diagram of our map in Figure 2. We have represented the map details for one team in a table. The other team area has been left blank for it is a copy and paste mirror image of the same around the diagonal.

*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	*
1	W	W	W		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	1
2	W	W	W	W		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
3	W	W	W	W	W		41	42	43	44	45	46	47	48	49	50	51	52	53	54	3
4	W	W	W	W	W	W		61	62	63	64	65	66	67	68	69	70	71	72	73	4
5	2	21	W	W	W	W	W		81	82	83	84	85	86	87	88	89	90	91	92	5
6	3	22	41	W	W	W	W	W		101	102	103	104	105	106	107	108	109	110	111	6
7	4	23	42	61	W	W	W	W	W		121	122	123	124	125	126	127	128	129	130	131
8	5	24	43	62	81	W	W	W	W	W		141	142	143	144	145	146	147	148	149	150
9	6	25	44	63	82	101	W	W	W	W	W		161	162	163	164	165	166	167	168	169
10	7	26	45	64	83	102	121	W	W	W	W	W		181	182	183	184	185	186	187	188
11	8	27	46	65	84	103	122	141	W	W	W	W	W		201	202	203	204	205	206	207
12	9	28	47	66	85	104	123	142	161	W	W	W	W	W		221	222	223	224	225	226
13	10	29	48	67	86	105	124	143	162	181	W	W	W	W	W		241	242	243	244	245
14	11	30	49	68	87	106	125	144	163	182	201	W	W	W	W	W		261	262	263	264
15	12	31	50	69	88	107	126	145	164	183	202	221	W	W	W	W	W		281	282	283
16	13	32	51	70	89	108	127	146	165	184	203	222	241	W	W	W	W		301	302	16
17	14	33	52	71	90	109	128	147	166	185	204	223	242	261	W	W	W	W		321	17
18	15	34	53	72	91	110	129	148	167	186	205	224	243	262	281	W	W	W	W		18
19	16	35	54	73	92	111	130	149	168	187	206	225	244	263	282	301	W	W	W		19
20	17	36	55	74	93	112	131	150	169	188	207	226	245	264	283	302	321	W	W		20
*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	*

Figure 3.1: Schematic Map Representation

### 3.2 Graphical Map Representation

The graphical representation of our map respectively for both Demons and Angels is shown in Figure 3. Notice the visibility for both the teams.



Figure 3.2: Views of the Map

### 3.3 Notification area

The game is accompanied by an attribute area on both side of the maps, where the users can keep track of the games progress, etc. The schema for such an area is clearly depicted in Figure 4.

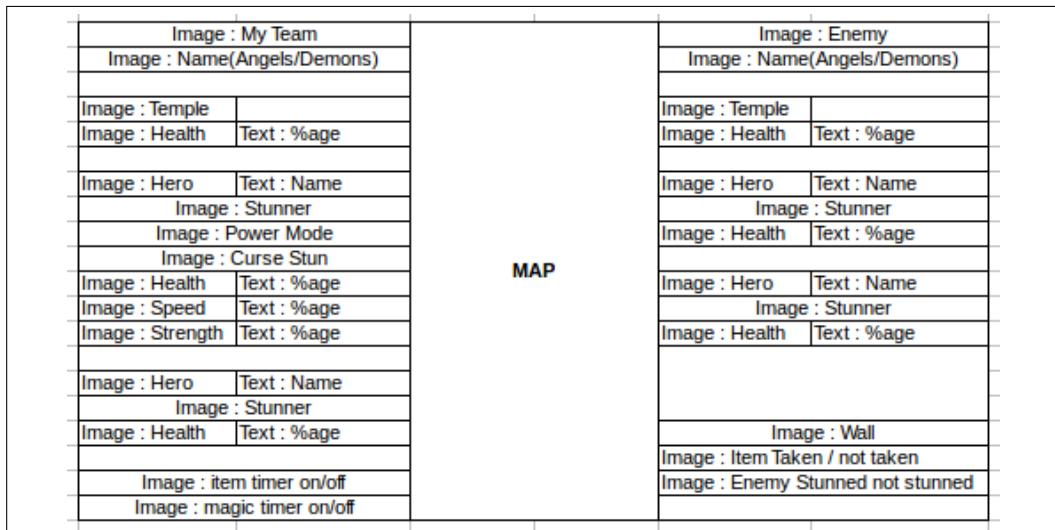


Figure 3.3: Schematic view of the attribute space

### 3.4 Complete Map look

The map in its entirety is shown in Figure 5. Notice the attribute area on either side.

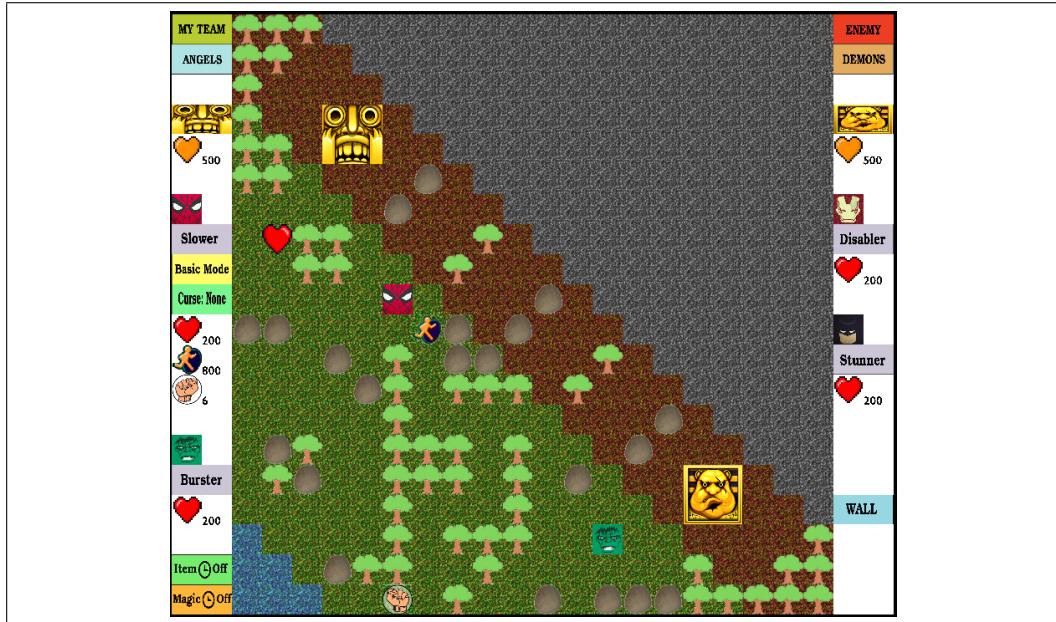


Figure 3.4: Complete Map with attribute space

# Chapter 4

## Game Attributes

### 4.1 Hero Details

We have four heroes to play with as shown in Figure 6.

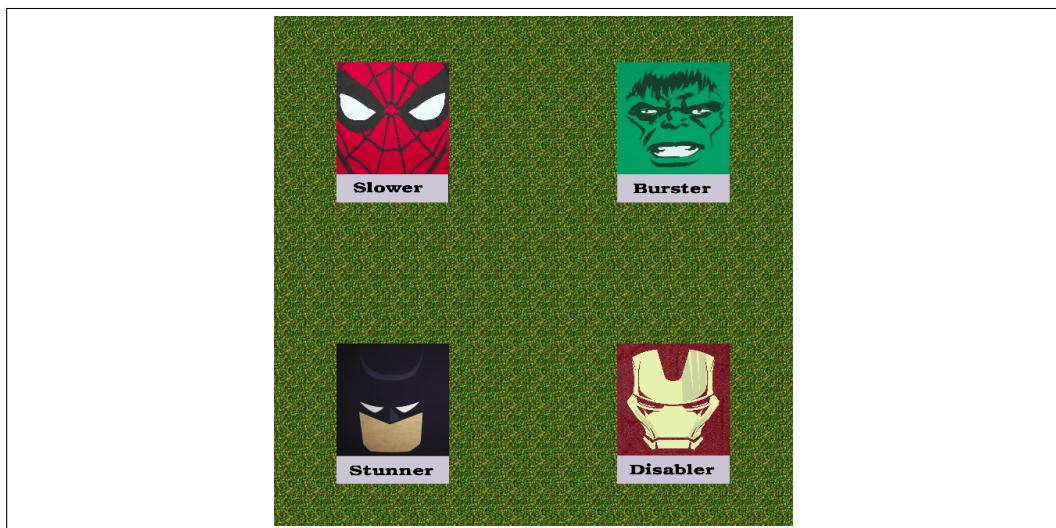


Figure 4.1: Heroes

Each hero has a unique magic power as described:

1. Stunner: Freezes the enemy player from attacking, moving, etc. for few seconds.
2. Slower: Reduces the attack capability of the enemy player for few seconds.
3. Disabler: Disables the enemy player from using any magical power for few seconds.
4. Burster: Does burst damage in a single shot.

A hero is not allowed to use magic power in succession. It has to wait for some time before it can re-use the magic.

When a player uses its magic power on an enemy player, the enemy player is said to be cursed.

## 4.2 Game Stats

Each temples initial health is 500. Each heros initial heath is 200.

A hero has following attributes besides its health:

1. Strength: Damage done on a single attack
2. Speed: Movement speed (MIN 0 MAX 5)

The above attributes depend on the hero type, as follows:

1. Stunner: Strength - 4, Speed - 2
2. Slower: Strength - 5, Speed - 2
3. Disabler: Strength - 6, Speed - 3
4. Burster: Strength - 7, Speed - 2

## 4.3 Item Details

We have four items in our game. These items add to certain capabilities of the hero.

1. Speed Gain: Increases movement speed of the player by 1.
2. Strength Gain: Increases damage capability of the player by 2.
3. Temple Healer: Increases health of the players temple by 50.
4. Heath Gain: Increases health of the player by 20.

# Chapter 5

## Running the game

You can download the source code from “<https://github.com/abhiagar90/rendezvous>”. To build the code run ‘make’ from the game directory. You should have these commands already ran:

1. sudo apt-get install cmake
2. sudo apt-get install freeglut3-dev
3. sudo apt-get install mesa-common-dev
4. sudo apt-get install xorg-dev libglu1-mesa-dev
5. sudo apt-get install libpthread-stubs0-dev

To install audio packages if needed in SoundAll.h, use the command :  
“sudo apt-get install libsfml-dev lsfml-audio”

To run, after compiling the code, run ‘./a.out’ from within the terminal in the current directory.