Embedded System 2022 Fall Project TBG battle system

1. Background and Basic Description

Turn-based games (TBG) are like SEER and Pokemon, players should select attack, defense, skills or props at every turn to defeat the other player.

In this project, we need to design a turn-based game using one or two miniSTM32 boards. The following functions should be implemented.

2. System implementation

2.1. Compulse functions (70%)

In this part, you need to implement some functions that must be completed, or you will lose the corresponding points of those unimplemented ones.

- **Game characters and attributes design** (15%)

Each player can select their characters (just like Pokemons), and each character has various attributes. Basically, name, head portrait, attack power(ATK), defense power(DEF), special skills and initial life points(HP) are essential ones.

As soon as all players select their characters, the attributes of these characters should be displayed on the LCD screen.

Each attribute of the character should be set reasonably, so that the players can battle multiple rounds against each other.

- **Touch screen operation** (10%)

All operations during the game, including but not limited to attacking, defending, releasing skills, etc., should be completed by using touch screen.

If you do not use touch screen to control the characters, but choose another way to operate, this part cannot be scored, but it does not affect the score of other parts.

- **Winning and losing judgment** (5%)

When HP of the character belonging to one player is equal to or less than 0, the player will be judged to have lost, and the information of victory and defeat should display on LCD screen.

- **Battle via wireless module** (30%)

Use two miniSTM32 boards to implement close range wireless battle.

You can choose any of the various wireless communication modules (2.4G, Bluetooth, or wi-fi) to implement the battle on-line.

Different players use their own miniSTM32 board to complete the battle operation, and the screen of each side should show the information of both players.

You should design a reasonable communication scheme to ensure the real-time and data accuracy of on-line matchmaking.

- **Report and presentation** (10%)

You should finish the project report as required. (It's recommended that each group to submit one report.)

Presentation should be given in the final lab class.

2.2. Optional functions (no more than 30%)

Functions of this part is optional. For each function you completed, you will get extra points accumulated to previous score, and score of this part shall not exceed 30% of the whole project.

- **Reasonable information prompt** (5%)

For example, when the game is beginning, the red LEDs flash 3 times, or LEDs flash differently when different player's turn arrives.

In this function, you should design more than 2 kinds of way to prompt if you want to get full 5% bonus points.

- **More attack or defense skills for one character** (5%)

For some characters, you can design more than one kind of attack or defense skills, and players can choose any skill on a new turn when battling.

- **More different characters to be selected** (5%)

Design more than one kind of characters with different attributes to be selected by players.

- **Multi-character teams** (5%)

In one battle, each player can use more than one character.

When HP of the first character is equal to or less than 0, the next character is automatically summoned.

When HP of the last character is equal to or less than 0, the player will be judged to be lost.

- **Diversified skill props design and reasonable numerical design** (10%)

Design multiple props that can be used by characters, such as HP recovery packs, powerful weapons, armor, and other resource packs.

The special resource packs can appear randomly or in some other reasonable logic.

- **PvE** (5%)

One side is a real player and the other side is a machine player. The machine player can score this part as long as it can operate randomly at its turn.

- **Character development** (5%)

When satisfying some specific conditions, the characters can upgrade or evolve.

Rules of this part should be designed reasonably.

- **User identification** (5%)

You can design a simple database to store some basic information of different players, and once a specific player log in, his/her information can displayed.

- **Some transition animation or delicate UI** (5%)
- **2v2 on-line battle** (30%)

On the basis of two players' battle, you should design a mode which supports multiple players (larger than or equal to 4) to battle on-line. In the battle, it's on you that a single player is a team or more players are a team. The win-or-lose is depended on the unit of team.

You need to design suitable mechanism for the multi-edge communication, to make sure this function goes accurately and smoothly.

- **Some other unmentioned bonus** (30%)

Any other additional bonus points that can make the game more interesting are allowed, and the score is measured against the difficulty of implementing various functions above, scores of this part range from 1% to 30% according to the on-site presentation.

3. Submission

This project should be finished before the final class.

The report and the whole project should be compressed to a zip file and submitted on Sakai site.

One submission for one group.