HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

EMBEDDED SYSTEM AND RECONFIGURABLE COMPUTING LABORATORY

CAPTAIN ROCKET SPECIFICATIONS

GROUP 3 - ESRC K57:

Nguyen Viet An

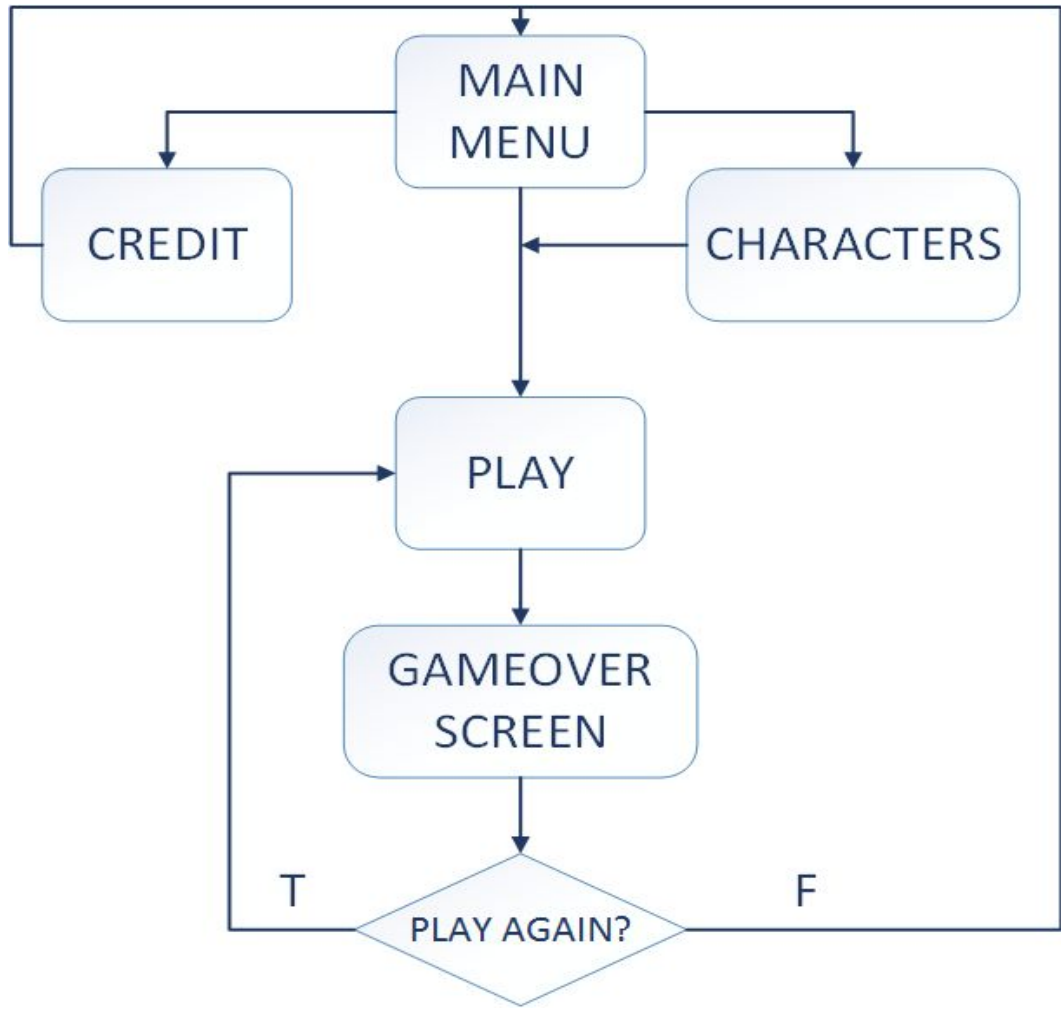Pham Hong Minh

Nguyen Hoang Long

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I. PROPOSAL

Captain Rocket is a popular mobile game for users in 2 famous operating system: iOs and Android. This game, from Ketchapp company, has some common features to other successful games: It is easy to play these games but it is very difficult for the players to get high scores. In this summer, there is a competition related to Captain Rocket game in our laboratory that is a chance for 57th course's group to compete with the other teams. It must be a good opportunity for us to improve our knowledge about VHDL, DE1 interface, teamwork skill and so on.

II. BLOCK DIAGRAM

III. FUNCTIONAL REQUIREMENTS

★ **Peripherals:** Keyboard, speaker

★ **Main menu**

- Show : "CAPTAIN ROCKET" on the top

- Show: "By Group 3 - ESRC K57" below

- Show "Play" , "Choose characters" and "Credit" buttons

★ **During the game**

- Use 2 buttons: "Forward" and "Back"

- Score depends on the distance the character has gone (in meters)

- The minimum score is 0 (zero)

- There are 4 types of rocket:

  - **The normal rocket**

  - **The speed rocket:**
    - Move 50% faster than the normal one

  - **The teleport rocket:**
    - Same speed to the normal rocket

- The character moves forward 10 m

  - **The trap rocket:**

    - Same speed to the normal rocket

    - The character moves backward 10 m

More details about rockets:

*In the first 10 m, there are only the normal rockets. The special rockets only appear in 10+ m.

*All of three special types of rocket appear randomly, but the minimum distance between two rockets in same types is 10 m. Their height is also random.

*If we divide the height of the screen into 10 unit:

- The height of the character's jump when he land on any rockets is 3 unit.

- The rockets appear from unit 4 to unit 8

  - There are 6 types of sounds:

    - Background music

    - Sounds when landing on the teleport rocket

    - Sounds when landing on the trap rocket

- Sounds when breaking the record

- Sounds when landing on the sea

- Sounds when landing on the head of rockets

○ Game over if the character:

- Does not land on any rockets

- Land on the head of any rockets

- Killed by laser from ships

★ **Gameover**

○ Show the score

○ Show the highest score above

○ If the player break the highest score, show the line "New Record" and a Star

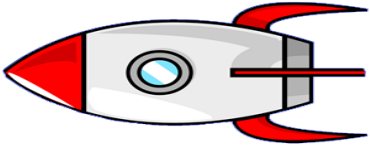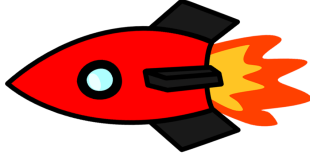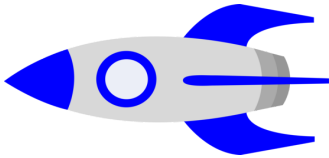○ Show "Menu" and "Play" buttons so that the player makes a choice

IV. NON-FUNCTIONAL REQUIREMENTS

★ **Main Menu:** Line "CAPTAIN ROCKET" with large font size

★ **Choose the character:** Choose one of the following characters:

The Red Captain	The Blue Captain	Captain America

★ **The features of rockets:**

The normal rocket	The speed rocket
The teleport rocket	**The trap rocket**

★ **Resolution:** HD (1280x720)

★ **Program Language:** VHDL

★ **Interface Language:** English

★ **Game background:**

- Show the score on the top

- On the top: Blue sky with clouds (from unit 9 to 10)

- On the bottom: Sea with ships, sailboats, lighthouses (from unit 1 to 2)

- Milestones in order to mark the highest score

★ **Time to finish:** 7 weeks (Deadline: 15/8)