"Operation?" Program Manual

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Description

"Operation?" is a single player game created for the DE1-SOC board using C-language. The gameplay consists of identifying organs in a human body diagram and pressing their corresponding keys on a PS/2 keyboard.

Motivation

The game presents an opportunity for students to practice human anatomy identification in a fun and interaction manner, allowing learning through a hands-on and visual experience.

Required Hardware

The game requires the use of a DE1-SOC Development Board and a PS/2 Keyboard.

Welcome Screen

The game greets the user with a welcome screen (*Figure 1*) prompting an "Enter" keypress. The display of the welcome screen indicates the successful initialization of operation parameters in the game. Pressing the "Enter" key will proceed the game to the next step.

Figure 1 Welcome Screen

Instructions Screen

The instructions screen (*Figure 2*) explains the story of the game and conveys the instructions as well as win conditions of the game. The game is played by pressing the number keys (non-numpad) corresponding to organs described in the next section. At this stage, the user only needs to input 1, 2, 3 or 4 to begin the game is easy, normal, hard, and a secret "limitless" mode.
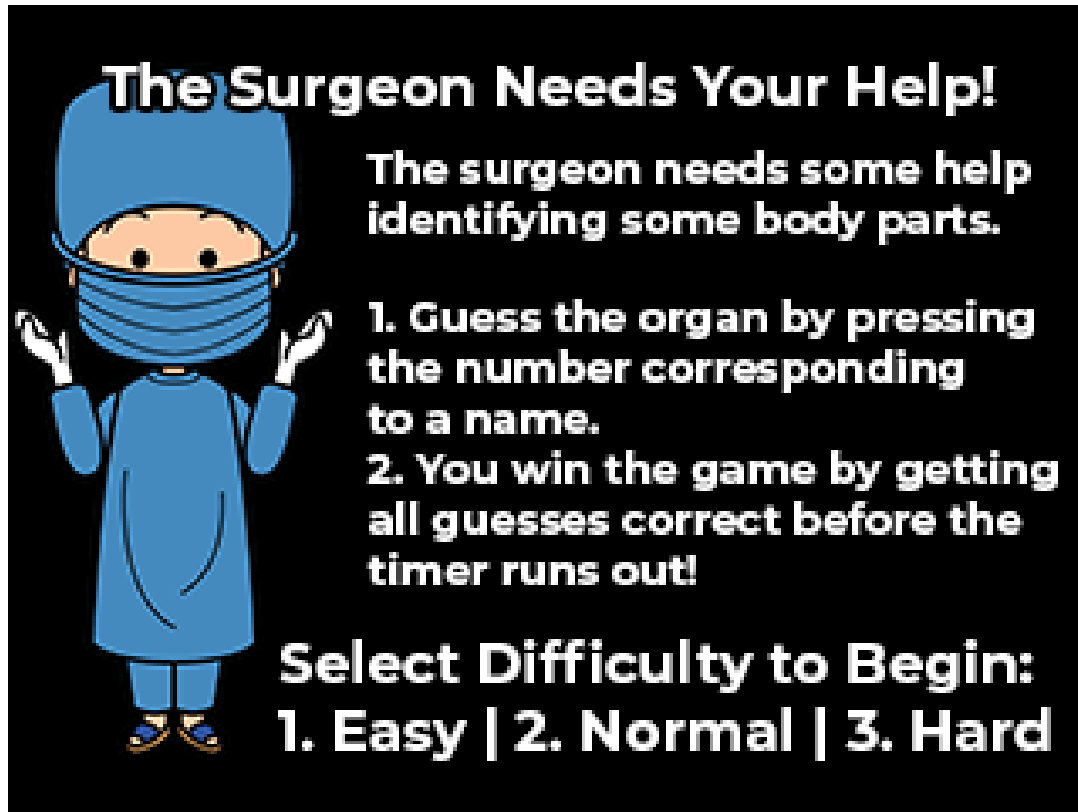

Figure 2 Instructions Screen

The difficulty of the game is determined using number of rounds and time per session (Table 1).

Difficulty	Rounds	Time Limit
Easy	5	60 Seconds
Normal	6	30 Seconds
Hard	7	15 Seconds
Limitless (hidden)	99999	99999 Seconds

Table 1 Game Rounds & Time Limit based on Difficulty

Gameplay

Gameplay (Figure 3) consists of pressing the corresponding buttons on the keyboard based on what the user believes to be the correct name of the highlighted organ. The selection of names and their corresponding keys is displayed on the left side of the screen with a tip on the bottom to remind the user how to make a selection. The right side of the screen displays a time counter and time limit information as well as current and historical streaks of correct answers. The current streak information is also shown on the Seven-Segment Display (*Figure 4*).
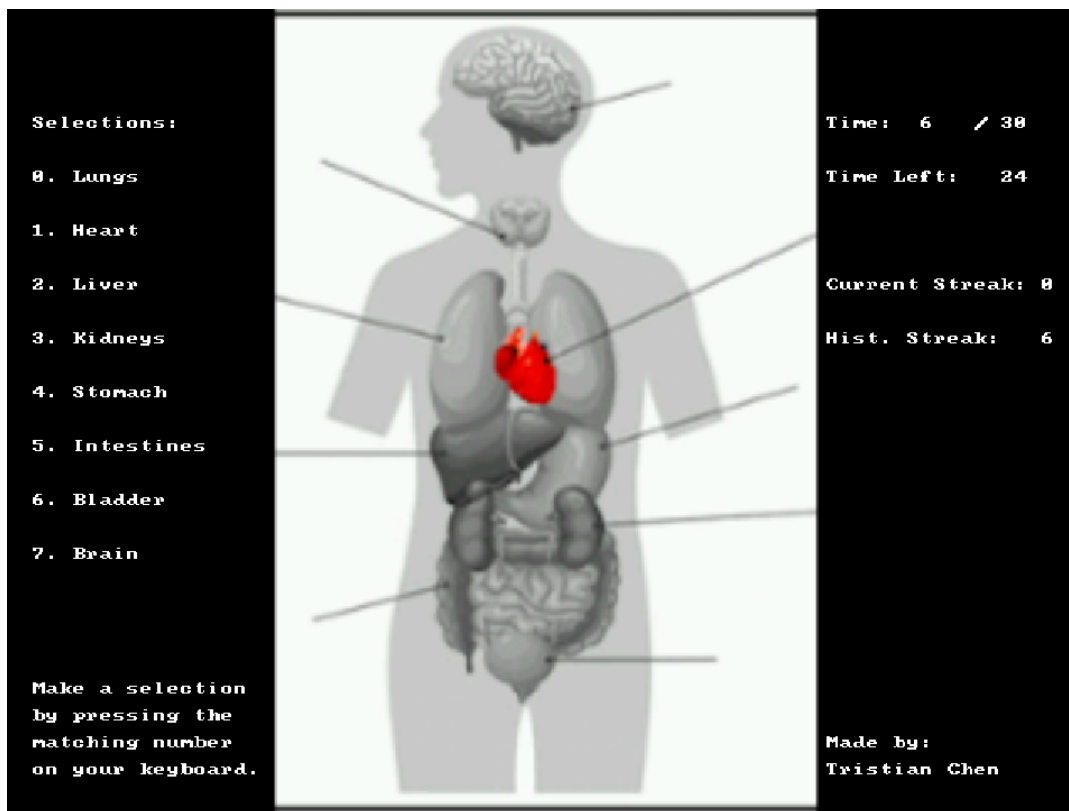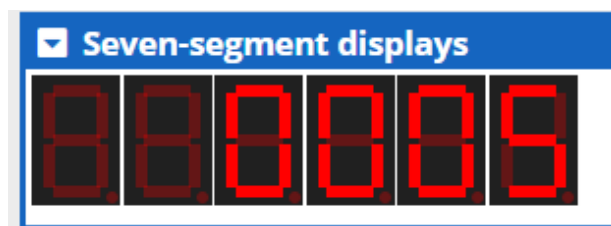

Figure 3 Gameplay Screen

Figure 4 7-Segment Display Score

Termination Conditions

Termination of the game is decided using 3 conditions: completion of task, ran out of time, or incorrect guess. The user "wins" the game in Easy, Normal, and Hard mode by correctly guessing all the highlighted organs (i.e. complete all rounds) within the given time frame. The time limit and rounds information is given in *Table 1* of the "Instructions Screen" section. The game can terminate by running out of time on the timer, in which the user will be shown a "Loss via Timer" screen (*Figure 5*). Should the user make an incorrect guess, the game terminate and show a "Loss via Incorrect Guess" screen (*Figure 6*). Should the user successfully complete the game, they will be shown a "Win" screen (*Figure 7*) followed by instructions to access the hidden "Limitless" mode, in which the user can continuously practice the game and try to obtain a "Historical Streak" record (explained below). The user's current streak for the session is recorded and is then compared to the historical highest streak, to which the higher number is kept. At termination, the user may choose to play the game again by pressing the "Enter" key, to which the user will be taken back to the "Instructions" screen.
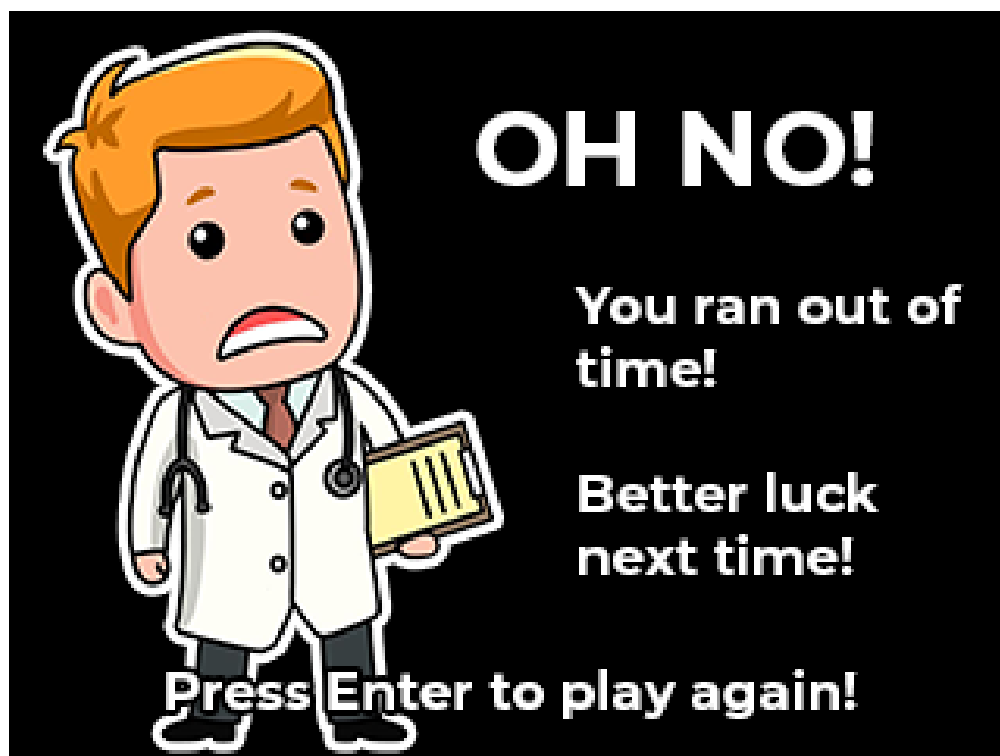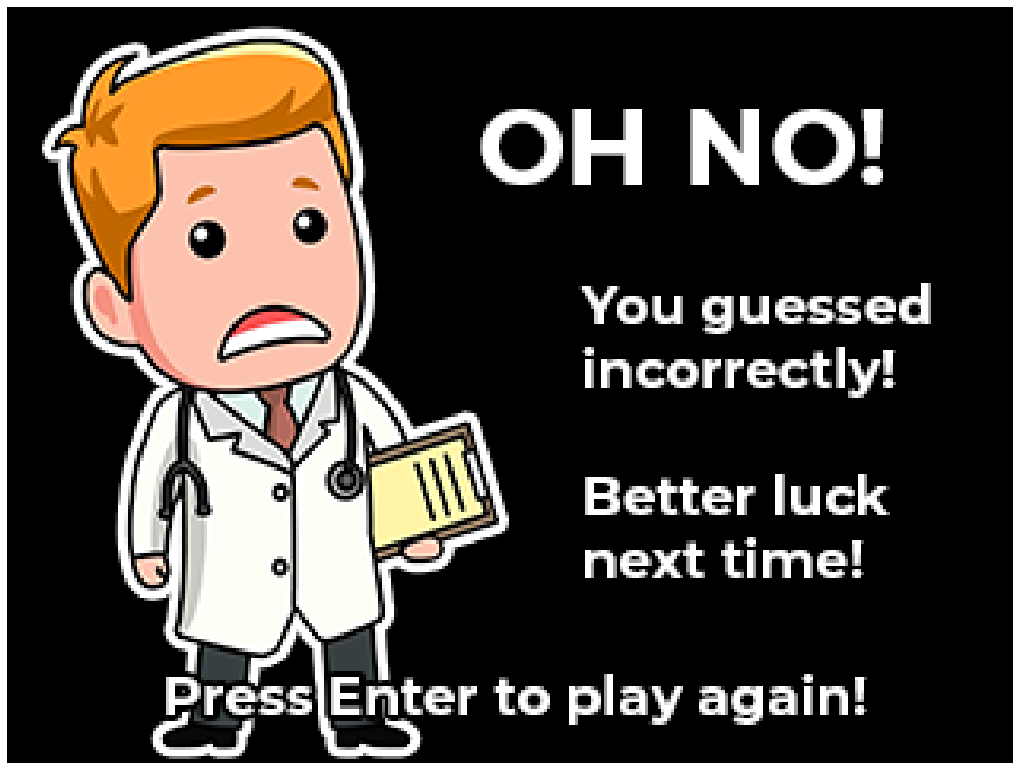

Figure 5 Loss via Timer Screen

Figure 6 Loss via Incorrect Guess Screen

Figure 7 Win Screen