Word Game in C

Project Overview

This project was developed within a C programming software development subject. The aim of the project was to create a scrabble-like game in C adhering to the ANSI C standards. This project has a technical focus and the game play aspect is secondary to the core principles of C memory management, data structures and creating a multi file project using standard C libraries. The following contains a brief overview of some of the core components as well as screenshots of the core operations.

Core Components

Data structures

The game utilises various data structures to store information such as the game board, letters, words and player information. The main game structure contains pointers to other core components.

Memory Management

Memory allocation is performed for all required components and freed when the application is closed. The Valgrind memory debugging tool was utilised to ensure this requirement was met.

File Operations

The application is provided with two command line arguments at startup which are filenames of the letters to be loaded (A bag of scrabble tiles containing the quantity of each letter and associated score value) and the dictionary file that users can check words against. The dictionary functionality also allows for players to add or delete words in the dictionary and save changes.

Game Play

Initialising players and game board

The player/players are presented with a prompt to enter the board size and their names. Once this information is entered each player is randomly dealt a hand and the board is printed.

Command interface

A Vim like command interface is included, players can type :help for a full list of commands. This includes commands for checking, adding and deleting words in the dictionary.

Playing words

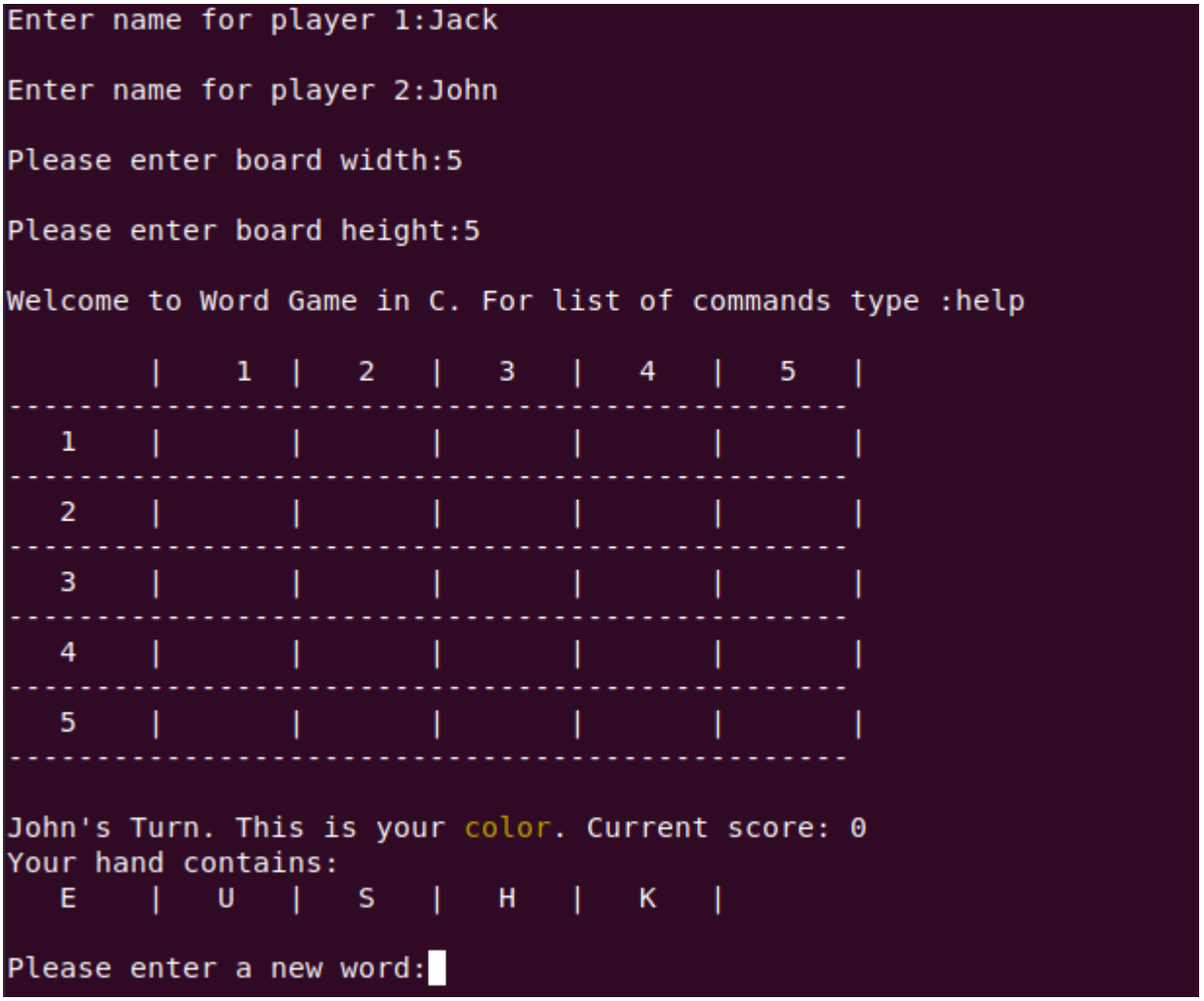
Players can enter any word that is made up of the letters in their hand, they are then prompted for the row and column they wish the word to start from as well as the orientation of the word on the board.

Scoring

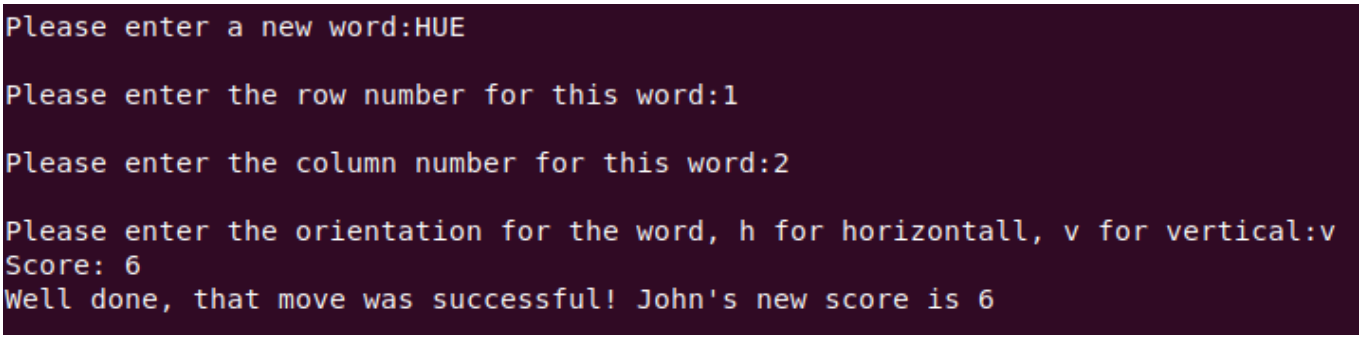
Players words are stored against a 2d array that makes up the game board. To calculate a players score all tiles associated with the player have their score added up to give a total score for that player.

Screenshots

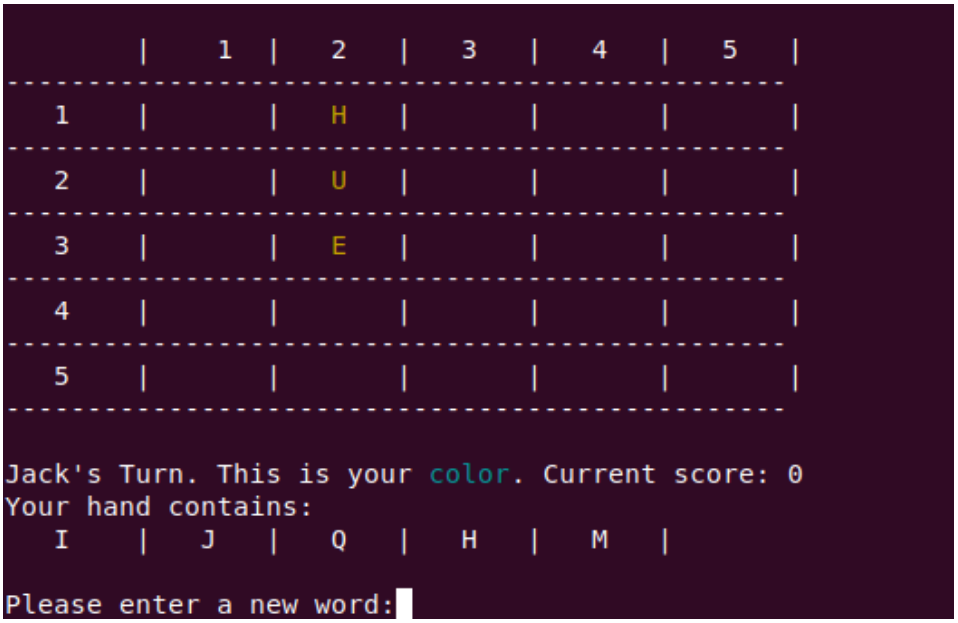
On game start the players names entered as well as board size. Players are randomly assigned a colour and a "coin" is tossed to decide who starts.



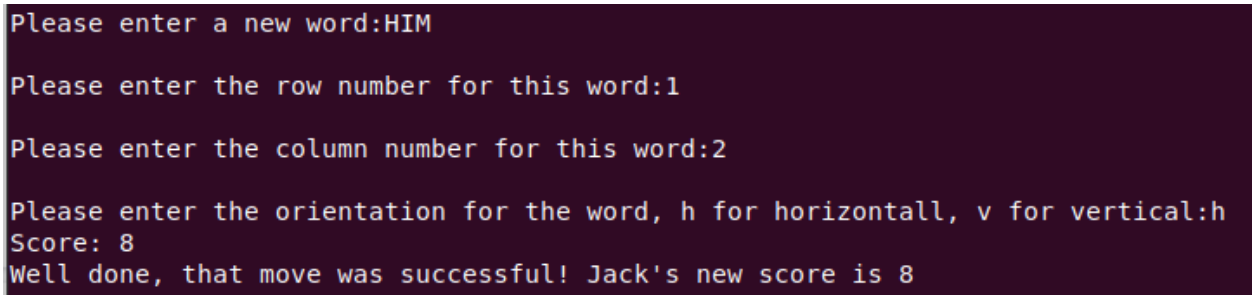
Player 2 (John) plays the word HUE from their hand, the letters are removed from their hand and placed on the board and new letters are randomly dealt to replace the letters they used. If there are no letters left in the "bag" then they will not be dealt new letters.



The board is re printed and it is now Player 1's turn.

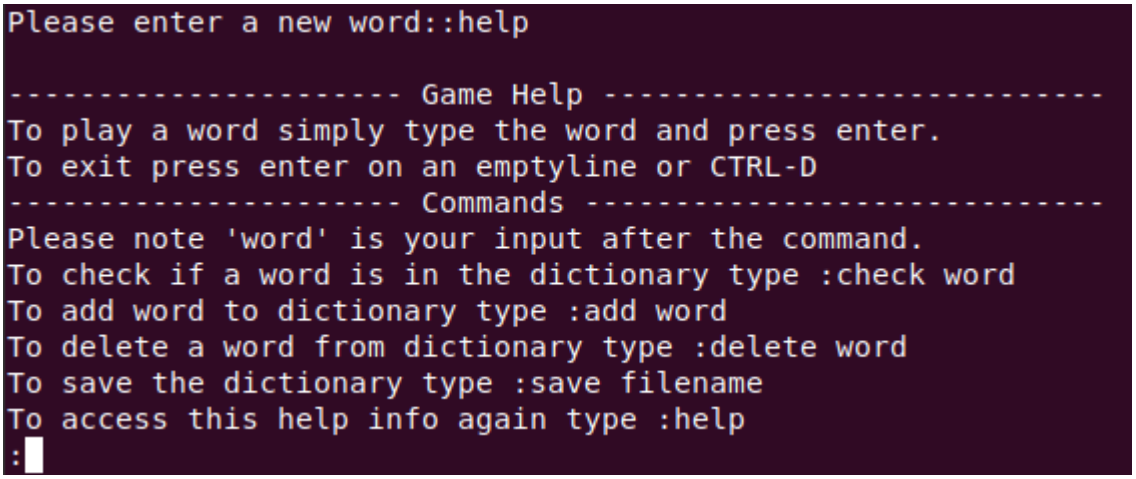


Player 1 plays the word HIM using the H that is already on the board. Only the I and M are used from their hand.

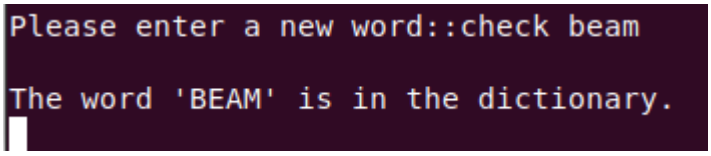


The board is re printed and the letters on the board are changed to reflect the new owners. The game play loop continues until no word can be placed or the game runs out of letters.

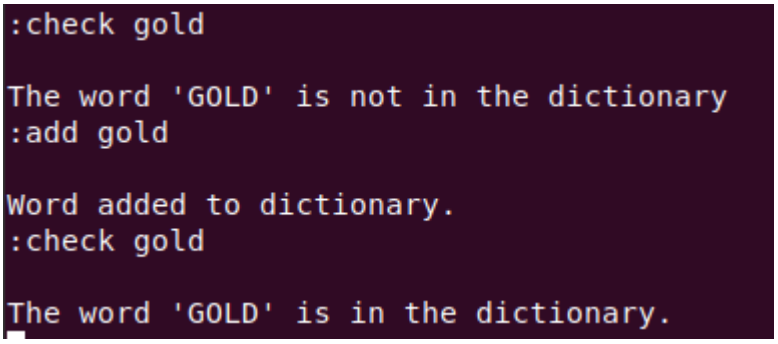
Results of the :help command



Checking a word against the dictionary file



Checking a word that is not in the dictionary and then adding it in



When the game is excited by pressing CTRL-D the players scores are displayed