ANKARA UNIVERSITY
COM1002
Spring 2021-2022
PA3 – Board Game

Due Date: 20.05.2022 23:59

The aim of this game is to collect maximum points by shooting colored balls.

You must follow the following rules:

- The board size is dynamic and will be determined by your programs according to the given input. Write the necessary algorithm to determine the size of the board. Board size can be determined as maximum 50x50.
- In the example board below, the dimensions of the board is 5x8. For given the board, the outer edges will always be set as the wall. (‘#’ represents the wall).

- In the given input, board content will be given after the size of board (Refer to board file format at the end of this document). Board content will be displayed according to the input. In input;
  - ‘s’ represents start position mode: Showing X in Board.
    <s>[WS]<row_number>[WS]<col_number>
  - ‘c’ represents color balls mode. The color sequence and number should be determined dynamically.
    Colors => Red (R), Green(G), Blue (B)
    <c>[WS]<color>*
  - ‘p’ represents play mode. Play mode is shooting color with right or left position.
    A = left D = right R = Red G = Green B= Blue
    <p><[WS]> <color>*<[WS]>*<left |right>*<[WS]>*<color>*<left |right>*...
    ex: p AAB ARGB DGB
  - <q> finish game

  where [WS] is the white character (space).

- **Input format:**
  <row>[WS]<column>
  <s><[WS]><row_number>[WS]<col_number>
  <c><[WS]> <color>*
  <p><[WS]> <color>*<[WS]>*<left |right>*<[WS]>*<color>*
  <q>

  where [WS] is the white character (space), *: zero or more, |: or

Rules of the Game

In the game X shows the user. The user moves to the left and right without hitting the boundaries and tries to shoot the colors at the top. User must shoot the same color to explode the above colors. When the colors are different, they are not exploded and the thrown ball is added. When the colors are same, the user gains points according to the color of the balls: red 3, blue 1, green ball is 2 points. If there is the same color on the top of the exploded ball with the same shot to get them to score points. Received awards must be collected and printed.

- Finish conditions in this game:
    - if users finishes all balls.
    - if the user moves beyond the board limits while moving.
    - If balls accumulate and reach to user's location.
    - if user press ‘q’

Note: If the shot hits the board limit, it must be added to the bottom.

Warning: Any form of code copying, including the copies from the internet, is strictly prohibited. If we determine similarities between your codes with any other students in the class, it will be treated as cheating and will be punished. So, you would increase the risk of cheating when you see somebody else’s code directly or see a solution in the internet (i.e. somebody else might have also copied the same code from the internet like you, so both of these codes will be evaluated as copies, since they both copy from an external source. Such attempts will always be considered as cheating). You are supposed to write the program by yourselves.

Testing:

As usual, use *input redirection* mechanism of your operating system to test your programs. For example, if your executable is called as PA3, redirect the input.txt file to standard input using **<** operator and redirect your outputs to a file using **>** operator such as:

> ./PA3<input1.txt>myOutput1.txt

Then compare your outputs file with the given output files such as:

>diff myOutput1.txt output1.txt

Repeat this steps for all the given input and output files.

This kind of execution enables your programs to read inputs from a file without writing any file related functions (e.g. fopen(), fscanf() etc.). In other words, the getchar() or scanf() functions in your code reads data from the redirected files instead of the std. input in this way (e.g. keyboard).

Submission:

Before submission, rename your source file name as **StudentNumber.c.**

All submissions will be made using Moodle.

Example:

This example which is explained in detail below is also given to you as input3.txt and output3.txt.

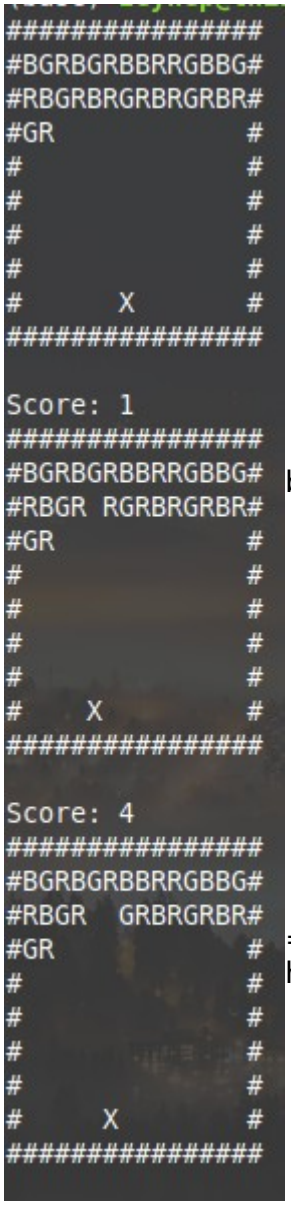
10 16 //board size

s 8 7 // Start position

c BGRBGRBBRRGBBGRBGRBRGRBRGRBRGR //colors array.

p AABDRDG //play mode

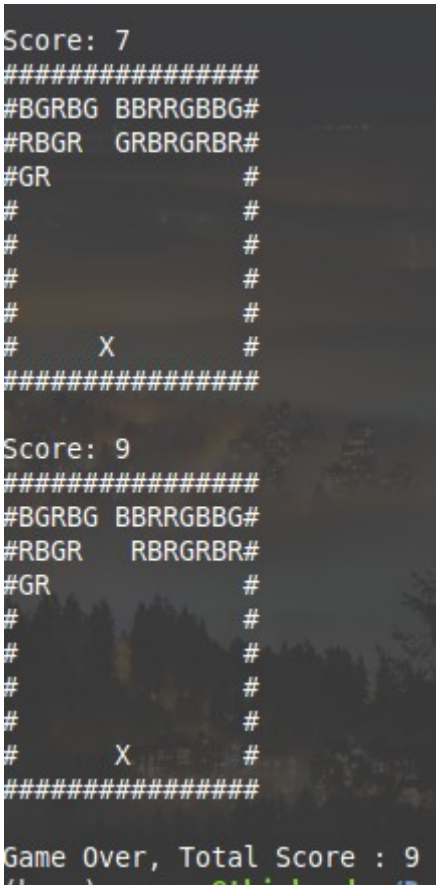
q //quit



=> board size, initial user state and color array after entering

=> go to the left twice and explode the blue. Score 1 because blue has 1 point.

=> go to the right and explode the red . Score 4 because red has 3 point.


Score: 7
################
#BGRBG BBRRGBBG#
#RBGR GRBRGRBR#
#GR   #
#   #
#   #
#   #
#   #
X
################
Score: 9
################
#BGRBG BBRRGBBG#
#RBGR   RBRGRBR#
#GR   #
#   #
#   #
#   #
#   #
X
################
Game Over, Total Score : 9