Individual project

SENG513 Winter 2020

Any student will be able to switch from the group project to an individual project. To switch to this individual project you send the instructor an email indicating you are switching to an individual project. The email must have the following format:

- you include all your group members in the CC field
- the subject of the email will be: SENG513 individual project switch
- the body of the email will include the group number

After you switch to an individual project:

- you still need to collaborate with your original group to finish M3
- you will still receive group grades for M1, M2 and M3
- if your group decides to continue with the original group project, you do not continue your involvement in finishing the group project or the final report, and you will not receive any grade based on your group's work
- you will receive your own individual grade for the individual project (worth 40%)

For groups that decide to finish the group project:

- if you end up losing group members due to them switching to the individual project, or due to illness, or due to some other reasons, I will adjust the marking scheme to account for this
- you are allowed to continue to work on the group project even if there is only a single group member left, although I would not recommend this

Overall instructions

For the individual project you will implement a web application that will allow two players to play a turn-based game against each other. You can choose to implement one of the following games:

- reversi (https://en.wikipedia.org/wiki/Reversi)
- connect-4 (https://en.wikipedia.org/wiki/Connect_Four)
- gomoku (https://en.wikipedia.org/wiki/Gomoku)
- ultimate tic-tac-toe (https://en.wikipedia.org/wiki/Ultimate_tic-tac-toe)
- checkers (https://en.wikipedia.org/wiki/Draughts)

Requirements

Your project needs to satisfy a number of requirements, as listed below.

Cookies

Your application will use HTTP cookies to store the username and color themes. If a player returns to the game, the cookie will be used by your application to automatically restore the player's username and color theme.

Color themes

You will implement at least 3 different color themes. A player will be able to select the color theme by clicking a single button (shown somewhere on the page). As soon as the theme button is clicked, the color theme of the entire game will change. Also, the last theme selection will be automatically saved the user's cookie.

Usernames

When a player visits the game page for the first time, they will get a randomly generated username. This username will be composed of random english words - for a sample implementation please visit: https://jsfiddle.net/ygo5a48r/

A player will be allowed to change their username to an arbitrary alphanumeric string. This username will be stored in a cookie so that if a player ever comes back to the site, their username will be retrieved from the cookie.

Game play

- Players will be forced to wait for their turn to make a move. The only functionality available to them during this wait time will be to switch the themes.
- The game will indicate to the player when it is their turn to play.
- As soon as the opponent makes a move, the game needs to show the move to the other player, and indicate to the other player it is their turn.
- The game will prevent a player from making an illegal move. The game should provide a visual cue, by either:
    - showing the player which moves would be legal; or
    - by showing the player that a move they selected is illegal.
- The game will detect when the game is over. The game will then display the final result of the game (win, loss or draw).

Game creation

Upon visiting the website, the player will have 3 different options to start a game:

1. The player will be given a unique random number, which they can share with their opponent (for example, they can text or email the code to a friend). Then they will wait for the opponent to enter the code. Once the opponent enters the code, the game will start.
2. If a player received a code from a friend, they will be able to use the code to join the game.

3. A player can decide to join a random game. This will pair up the player with another random player that also requests to join a random game. If there is such a player already, the game will start immediately. If there isn't, the player will need to wait until another player requests a random game.

Multiple user support

The game needs to support at least 5 simultaneous games (i.e. 10 concurrent users).

Not required functionality

Compared to the group project, you do not have to worry about a number or requirements:

- You do not need to support mobile devices.
- You do not need to support disconnects or server restarts.
- You do not need to worry about persistence, other than using cookies for usernames and themes, and setting up games between players.
- You do not need to submit a final project report.
- You do not need to do a live demo.
- You do not need to host your code on github.
- You do not need to implement authentication.
- You do not need to implement any other features other than the ones listed above.

Technology

You must use the following technologies:

- node on the server side;
- javascript, html and css on the client side;
- ajax, websockets or push events for real-time interaction.

You can also use the following technologies: express, jquery, bootstrap, scss, less, html, css, typescript., socket.io, sqlite, vuejs, react, angular.

Technologies you are **not allowed** to use:

- any 3rd party services, such as firebase, google cloud services, aws lambda, heroku;
- any programs that require separate installation and setup, such as: mongodb, mysql.

If you want to use any other technology not mentioned above, ask the instructor for permission. Please keep in mind that your individual project will be marked in your absence. Please make it easy for your instructor and your TAs to mark your project.

Submission

You have to submit the following to D2L, as part of one ZIP file:

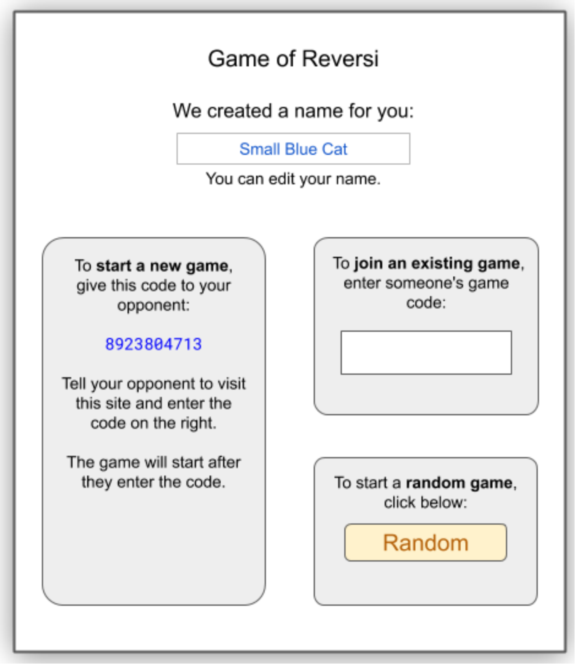
- all source code and resources required to run your application;

- detailed instructions on how to run your code (in a file called `instructions.pdf` or `instructions.txt`)

If you do not submit the above, your instructor / TA will not be able to mark your project.

Sample UI mockups with the game of Reversi.

- when a user navigates to the game, he is presented with the screen similar to the one on the right
- if this is the first time the user visited this page, he will get a randomly generated username (sample code https://jsfiddle.net/ygo5a48r/)
- the user is able to change his username by editing it in the input box
- the username (whether random or edited) should be saved it a cookie on the user's browser, so that when they return, they get the same username



Game of Reversi

We created a name for you:

Small Blue Cat

You can edit your name.

To **start a new game**, give this code to your opponent:

8923804713

Tell your opponent to visit this site and enter the code on the right.

The game will start after they enter the code.

To **join an existing game**, enter someone's game code:

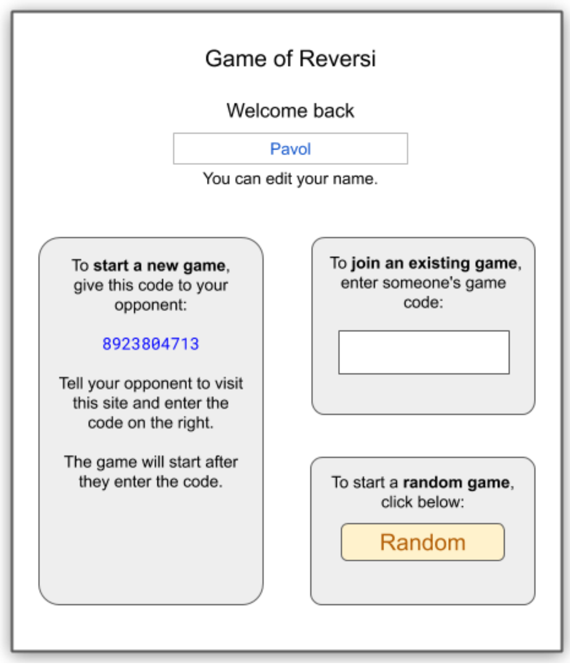
To start a **random game**, click below:

- returning users will get a slightly different screen, and they will keep their username from the previous game
- this username is still editable
- there are 3 ways to start a game:

  1. the user shares their unique random game code with an opponent, and then they wait for the opponent to enter it

  2. the opponent enters the game code

  3. the user clicks the "Random" button, in which case they will wait for someone else to do the same. As soon as someone else also clicks the random button, the game will start.



Game of Reversi

Welcome back

Pavol

You can edit your name.

To **start a new game**, give this code to your opponent:

8923804713

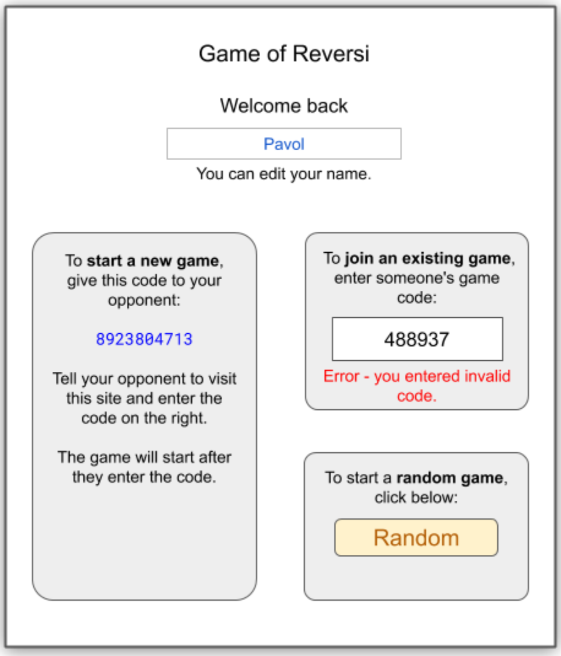
Tell your opponent to visit this site and enter the code on the right.

The game will start after they enter the code.

To **join an existing game**, enter someone's game code:

To start a **random game**, click below:

- if the user enters an incorrect game number, the game will let him know by displaying an error message
- the game starts under the follwing conditions:
  1. player A shares his unique code with player B and waits; once player B enters the code the game starts for both A and B
  2. player A clicks the random game button; if there is no other player waiting for random game, the player A must wait, and game starts as soon as some player B also clicks the random button
  3. player A clicks the random game button; if there is already a player B waiting for a random game, the game starts immediately



Game of Reversi

Welcome back

Pavol

You can edit your name.

To **start a new game**, give this code to your opponent:

8923804713

Tell your opponent to visit this site and enter the code on the right.

The game will start after they enter the code.

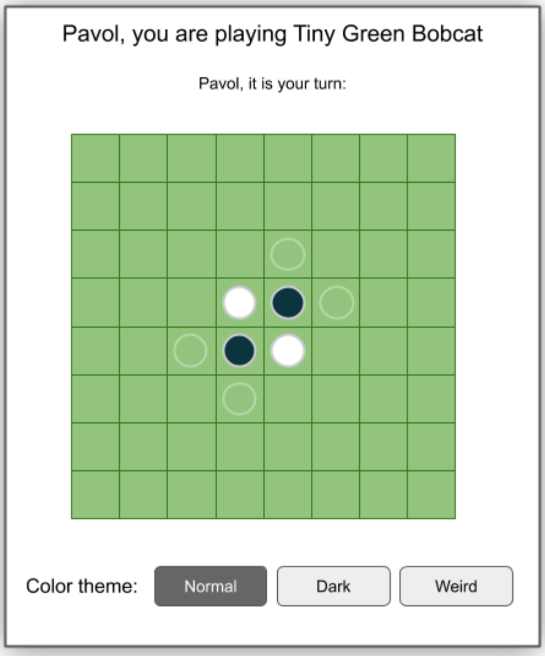
To **join an existing game**, enter someone's game code:

488937

Error - you entered invalid code.

To start a **random game**, click below:

- once the game starts, both users are presented with a screen similar to the one on the right
- the game will select one of the players randomly to go first, while the other player will have to wait
- the game will indicate to the player whose turn it is
- the game will allow players to choose one of 3 color themes, and the themes will also be stored in the player's cookie
- a player will only be allowed to make a valid play
- best way to indicate valid moves is 'highlighting' all valid options

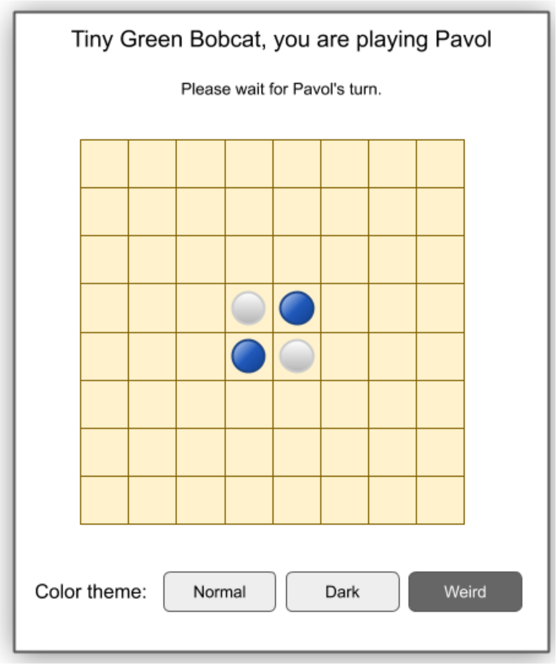


Pavol, you are playing Tiny Green Bobcat

Pavol, it is your turn:

Color theme:

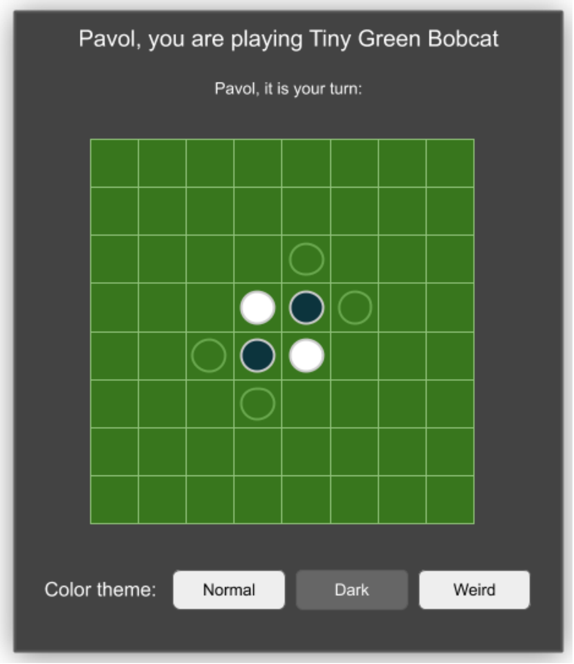
- the player without a turn will have to wait until the player with the turn makes a play
- both players can have different themes active at any time



Tiny Green Bobcat, you are playing Pavol

Please wait for Pavol's turn.

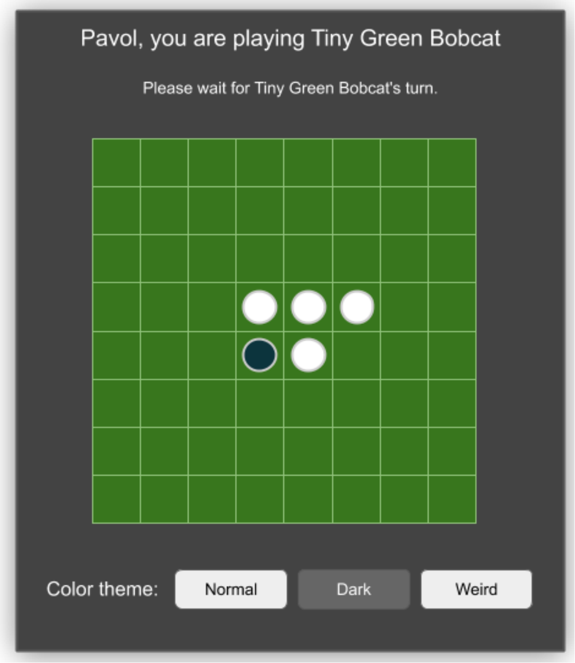
- current theme can be changed at any time
- the last selected theme will be saved in the user's cookie



Pavol, you are playing Tiny Green Bobcat

Pavol, it is your turn:

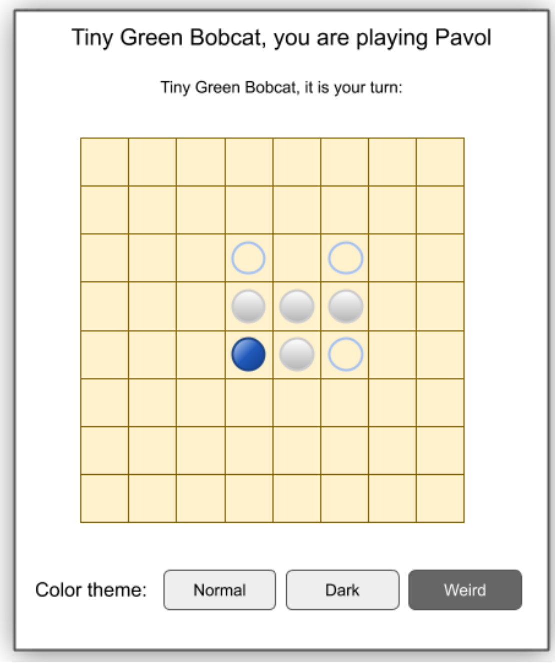
- once the player makes a turn, they will have to wait for their opponent to make a turn
- the game will indicate this visually



Pavol, you are playing Tiny Green Bobcat

Please wait for Tiny Green Bobcat's turn.

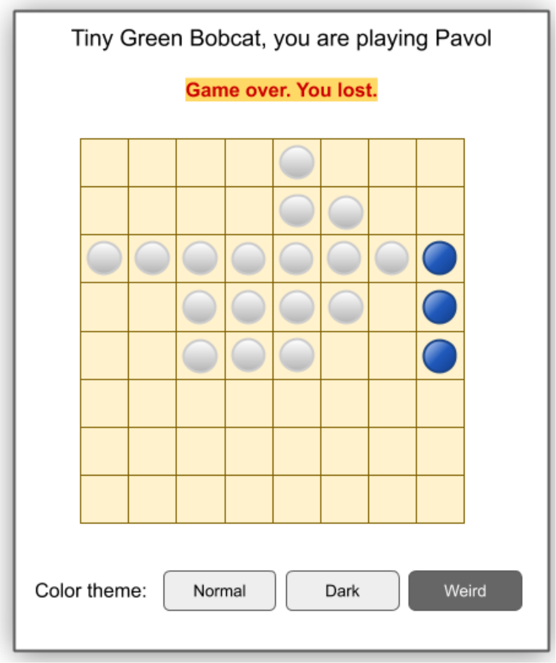
- the game always makes it obvious who's turn is next



Tiny Green Bobcat, you are playing Pavol

Tiny Green Bobcat, it is your turn:

- once the game is over, the winner is announced
- or a draw (if applicable)



Tiny Green Bobcat, you are playing Pavol

Game over. You lost.

Color theme: Normal Dark [✓ Weird]