

Programming Assignment 4 - Frogs and Toads

This assignment is due on or before 30/11/20 (23:59) and penalty for late submissions will be applied for this assignment.

Starting state



Lilypad list

1	2	3	4	5	6	7
F	F	F		T	T	T

Ending state



Lilypad list

1	2	3	4	5	6	7
T	T	T		F	F	F

The idea of the frogs and toads game is to make the frogs and toads switch places as shown above.

Game Rules

1. The frog or toad **can only move in one direction**. So if they start on the left, they can only move right. If they start off on the right, they can only move left.
2. The frog or toad **can move either one place to move into an empty space**
Or
Jump over another frog or toad to move into an empty space.
(They can't jump over two or more frogs or toads or move into a space already occupied by another frog or toad)
3. When the **frogs and toads have changed places the player has won.**

The player **can reset the game to the original layout or exit the game at any time while playing the game. Reset needs to set the list back to original position i.e.**

Lilypad list

1	2	3	4	5	6	7
F	F	F		T	T	T

4. The player **can choose between playing the game OR watching a demonstration game** showing how the frogs and toads can change places. Demonstration needs to include instruction on how to play game, examples of valid, invalid moves and examples for reset and exit option.

You should practice playing the game yourself until you are clear about the rules – then try working out the program logic on paper before coding.

Link to animated version of puzzle: <https://nrich.maths.org/6282> (You need to check whether flash is supported by your browser to play this game online using the link given above.)

When you start coding, code and test one small element at a time

Guidance

- Code the game according to the rules above. Frogs and toads **should be stored in a list and the list should be displayed after each change in position.**
- The player should enter the **from** and the **to** position for each move. For example, a starting move of

from: 3
to: 4

will move the frog in position 3 to position 4 and position 3 will become blank.

- The **index of a list begins at zero**, but the program will make adjustments so that the player can refer to the first position as **1**, the second position as **2** and so on.
- The program should check **if the move is valid and output an error message if the move is invalid**. If the move is valid the program **should move the frog/toad to the specified lilypad.**
- The player will be able to **choose between playing the game or seeing a demonstration.**
- The choices above should **repeat until the player** chooses to exit the program.

- While playing the game, the **player should be able to reset or exit the attempt** at any point.
- The game **should be coded using functions and parameter passing as appropriate.**

This assignment is worth 15% of the module marks.

It is essential that the code you submit is your own work.

Assignment deadline - **Monday 30th of November 2020.**

Late Submission Penalties:

Assignment deadline - Monday 30th of November 2020(23:59).

First half an hour after the deadline - No late penalties

After the first 30 minutes there will be 5 marks reduction for every 30 minutes.

Marks will be deducted from total marks awarded. Total marks for this assignment is 100.

Marks for all tasks:

You must use lists and functions. Try to use functions with parameters where needed.

Menu option - Play, demonstration and exit has to be the main menu option for users. 10 marks for menu options.

Reset and exit options when playing game-25 marks (15 marks for reset and 10 for exit)

Demonstration - 20 marks

Playing the game -45 marks

For 45 marks you need to allow user to input 1 for representing the first position of the list, allow valid moves, display appropriate error messages for invalid moves and display winner after winning the game.

Reset and exit options must be available to user at all times when playing and esp. when unable to move their frogs/toads or after winning the game.