PROG12583: Assignment 3

Instructions

The game of Nim is played as follows... You have a bunch of piles of sticks. Players take it in turn to remove any number of sticks from a single pile. The person to take the last stick wins.

Implement a game of Nim between two players. Use 3 piles of sticks with 3, 5, and 7 sticks in each pile. Before each turn, you should display the piles. Keep track of whose turn it is and declare a winner at the end. Do not let the user choose to take from an empty pile, and do not let the user choose fewer than 1 stick or more than the number of sticks in the pile. When the game is over, give the option to play again.

Example Run

```
Welcome to NIM!!!

Player 1's Turn
1: ***
2: *****
3: *******
Pile? 3
Sticks? 4

Player 2's Turn
1: ***
2: *****
3: ***
Pile? 1
Sticks? 4
Too many sticks!
Sticks? 3

Player 1's Turn
1:
2: *****
3: ***
Pile? 1
No sticks in that
pile.
Pile? 3
Sticks? 3

Player 2's Turn
1:
2: *****
3:
Pile? 2
Sticks? 5
PLAYER 2 WINS!!!!

Play again? No

Goodbye!
```

Architecture

The code to play a single game should be encapsulated in a **game function**. This function should play a complete game and then return the number of the player who won (1 or 2). Feel free to define other helper functions if there are parts of the code that are repeating a lot.

Then there should be a **main function** whose job it is to call the game function in a loop. At the end of each game, it should output who won (using the return value of the game function) and then ask if they want to play again and loop back if they say yes. Then running the program means calling the main function.

The game function has to be pretty loopy. You will have an outer loop for the game, then an inner loop for each round of the game, then input loops to check each input and loops to output the piles of sticks.

Advice

- Start with the code for a single round of the game, then wrap that in a loop and complete the

game function a single game. Then write the main function. Then add the input checking loops to the game function.

- Use a variable to keep track of whose turn it is. Then at the end (or beginning) of each round, switch the player from 1 to 2 or 2 to 1. If you use this variable effectively, you will have to write much less code.
- Start early! Don't leave this one until the last minute.

Extra Challenges:

- Allow other versions of the game (e.g. choose the number of sticks and piles, last stick loses, last stick wins, etc). Have the game function accept parameters to control these things. Let the user choose between these versions in the main function at the beginning of each game.
- Implement a computer player who chooses a legal move randomly
- Research the winning strategy and implement it for the computer player

Play Nim on line here: https://www.transum.org/Software/Nim