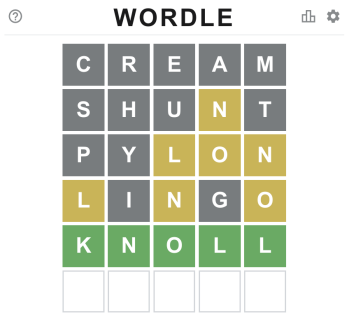
Homework 5

Wordle is a simple daily word puzzle game that became wildly popular around 2021–2022. It was originally created by a software engineer called Josh Wardle as a small game for himself and his partner. Later he put it online for friends and family, and it quickly went viral on social media (especially Twitter/X, where people posted their colored grids). In early 2022, the game was acquired by *The New York Times* and moved to the NYT Games website, where it is still published as a daily puzzle.

Main facts:

- One puzzle per day: everyone in the world gets the **same secret word** each day.
- The word is always a 5-letter English word.
- The player has 6 guesses to find the word.
- After each guess, the game gives feedback using colors:
    - Correct letter in correct position (Green).
    - Correct letter in wrong position (Yellow).
    - Letter not in the word at all (No color).

Here is an example of a grid representing a winning scenario for the word KNOLL on the fifth attempt (out of the six allowed):



In this assignment, you will implement a simplified console version of Wordle in Java.

How the Game Works (Step by Step)?

Basic rules

- The computer chooses a secret 5-letter word (e.g., `APPLE`) from a dictionary.
- The player has 6 attempts to guess the word.
- Each attempt must be a 5-letter word.
- After each guess, the computer prints feedback for each of the 5 letters.

We will represent feedback using characters and not real colors (since we are in a text terminal):

- `G` – Green: correct letter in the correct position.
- `Y` – Yellow: letter is in the secret word but in a different position.
- `_` – Gray: letter does not appear in the secret word.

Example secret word: `APPLE`

Player's guess number 1: `ALERT`

Let's compare positions:

1. `A` vs `A` → correct letter, correct position → `G`
2. `L` vs `P` → `L` is in secret but in a different position (position number 4) → `Y`
3. `E` vs `P` → `E` is in secret at position 5 → `Y`
4. `R` vs `L` → `R` not in secret → `_`
5. `T` vs `E` → `T` not in secret → `_`

Guess number 1's feedback:

```
Guess: ALERT
Result: GYY__
```

Guess number 2: `PAPAL`

Positions:

1. `P` vs `A` → `P` is in secret (positions 2 and 3), but not at position 1 → `Y`
2. `A` vs `P` → `A` is in secret at position 1 → `Y` (correct letter, wrong position)
3. `P` vs `P` → exact match → `G`
4. `A` vs `L` → `A` is in secret → `Y` (in this assignment, we don't care if it already appeared in the guess)
5. `L` vs `E` → `L` is in secret at position 4 → `Y`.

Guess number 1's feedback:

```
Guess: PAPAL
Result: YYGYY
```

Note: Proper Wordle carefully handles repeated letters (not over-counting); in this assignment, for each guessed letter, if it's exactly at that position → `G`; else if it appears anywhere in the secret → `Y`; else `_`.

Assignment Description

We add a file called `dictionary.txt` containing a list of valid 5-letter words, one word per line, in UPPERCASE letters. The secret word needs to be randomly selected from this dictionary.

Program behavior

1. Read all words from `dictionary.txt` into a one-dimensional array of strings (using the `In` class).
2. Choose one word at random as the secret word.
3. The player has 6 attempts to guess the word:
    - For each attempt, read a 5-letter word from the *standard input* (using the `In` class).
    - Check that this guess is valid, i.e., it has exactly 5 words. Count it as one of the six guesses only if it's valid.
    - Compare the guess with the secret and compute a feedback pattern of length 5 using `G, Y, _`.
    - Store all guesses and feedbacks in a two-dimensional array of chars (rows = guess attempts, columns = 5 letters).
    - After each valid guess, print all previous guesses and feedbacks as a grid (board).
4. The game ends when:
    - The player guesses the word (all `G`s) → print a congratulation message.
    - Or the player uses all 6 valid attempts without guessing → print the secret word and end the game.

Implementation instructions

The skeleton class `Wordle` already includes several functions that you are expected to use in your implementation. To help you get started, we have already implemented some of these functions and added instructions and example code in the `main` method, where the main game loop runs.
All the functions that appear in the skeleton must be implemented, but we do not restrict how you structure your `main` method. If you wish, you may redesign the implementation of `main`, as long as all declared functions are still implemented (even if you choose not to use them), and you keep all printings exactly the same as they are in the given implementation. That said, we recommend that you follow the original structure we provided.

Note: The function `computeFeedback(String secret, String guess, char[] resultRow)` is responsible for producing the feedback for one guess in the Wordle game. The function recieves:

- `secret` – the secret 5-letter word the player is trying to guess
- `guess` – the player's current guess (also 5 letters)
- `resultRow` – a one-dimensional `char[]` with length 5, representing one row of the 2D results array

Remember that the full results table is a two-dimensional array of size `MAX_ATTEMPTS` × `WORD_LENGTH`, but this function only works on one row at a time.

Full running example 1

```
% Wordle

Enter your guess (5-letter word): HELLO
Current board:
Guess 1: HELLO   Result: YY__Y

Enter your guess (5-letter word): PHASE
Current board:
Guess 1: HELLO   Result: YY__Y
Guess 2: PHASE   Result: GG__G

Enter your guess (5-letter word): PHOBE
Current board:
Guess 1: HELLO   Result: YY__Y
Guess 2: PHASE   Result: GG__G
Guess 3: PHOBE   Result: GGG_G

Enter your guess (5-letter word): PHONE
Current board:
Guess 1: HELLO   Result: YY__Y
Guess 2: PHASE   Result: GG__G
Guess 3: PHOBE   Result: GGG_G
Guess 4: PHONE   Result: GGGGG

Congratulations! You guessed the word in 4 attempts.
```

Full running example 2

```
% Wordle
RADIO
Enter your guess (5-letter word): HELLO
Current board:
```

```
Guess 1: HELLO   Result: ____G

Enter your guess (5-letter word): PHONO
Current board:
Guess 1: HELLO   Result: ____G
Guess 2: PHONO   Result: __Y_G

Enter your guess (5-letter word): RATIO
Current board:
Guess 1: HELLO   Result: ____G
Guess 2: PHONO   Result: __Y_G
Guess 3: RATIO   Result: GG_GG

Enter your guess (5-letter word): RODEO
Current board:
Guess 1: HELLO   Result: ____G
Guess 2: PHONO   Result: __Y_G
Guess 3: RATIO   Result: GG_GG
Guess 4: RODEO   Result: GYG_G

Enter your guess (5-letter word): RETRO
Current board:
Guess 1: HELLO   Result: ____G
Guess 2: PHONO   Result: __Y_G
Guess 3: RATIO   Result: GG_GG
Guess 4: RODEO   Result: GYG_G
Guess 5: RETRO   Result: G__YG

Enter your guess (5-letter word): ROMEO
Current board:
Guess 1: HELLO   Result: ____G
Guess 2: PHONO   Result: __Y_G
Guess 3: RATIO   Result: GG_GG
Guess 4: RODEO   Result: GYG_G
```

```
Guess 5: RETRO   Result: G__YG
Guess 6: ROMEO   Result: GY__G

Sorry, you did not guess the word.
The secret word was: RADIO
```