Trace of our movements in this gameplay (copied from terminal):

```
src % python run.py
| | | |
| | | |
| | | |
Turn: X
Player X took position (2, 1).
| | | |
| | | |
| |X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 118ms/step
Selected emotion: 0
Emotion detected as neutral (row 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise, press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 100ms/step
Selected emotion: 0
Emotion detected as neutral (col 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise, press Enter to continue.

Player O took position (0, 0).
|O| | |
| | | |
| |X| |
Turn: X
Player X took position (1, 0).
|O| | |
|X| | |
| |X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
```

```
1/1 [==============================] - 0s 48ms/step
Selected emotion: 0
Emotion detected as neutral (row 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 39ms/step
Selected emotion: 0
Emotion detected as neutral (col 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (0, 0) is already taken.
|O| | |
|X| | |
| |X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 41ms/step
Selected emotion: 1
Emotion detected as happy (row 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 40ms/step
Selected emotion: 0
Emotion detected as neutral (col 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (1, 0) is already taken.
|O| | |
|X| | |
| |X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 113ms/step
Selected emotion: 1
Emotion detected as happy (row 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 45ms/step
Selected emotion: 0
Emotion detected as neutral (col 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (1, 0) is already taken.
|O| | |
|X| | |
| |X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 53ms/step
Selected emotion: 0
Emotion detected as neutral (row 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 41ms/step
Selected emotion: 1
Emotion detected as happy (col 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Player O took position (0, 1).
|O|O| |
|X| | |
| |X| |
Turn: X
```

```
Player X took position (0, 2).
|O|O|X|
|X| | |
| |X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 46ms/step
Selected emotion: 1
Emotion detected as happy (row 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 41ms/step
Selected emotion: 1
Emotion detected as happy (col 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Player O took position (1, 1).
|O|O|X|
|X|O| |
| |X| |
Turn: X
Player X took position (2, 0).
|O|O|X|
|X|O| |
|X|X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 57ms/step
Selected emotion: 0
Emotion detected as neutral (row 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 40ms/step
Selected emotion: 1
Emotion detected as happy (col 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (0, 1) is already taken.
|O|O|X|
|X|O| |
|X|X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 40ms/step
Selected emotion: 0
Emotion detected as neutral (row 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 39ms/step
Selected emotion: 0
Emotion detected as neutral (col 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (0, 0) is already taken.
|O|O|X|
|X|O| |
|X|X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 104ms/step
Selected emotion: 0
Emotion detected as neutral (row 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.
```

```
reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 46ms/step
Selected emotion: 1
Emotion detected as happy (col 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (0, 1) is already taken.
|O|O|X|
|X|O| |
|X|X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 43ms/step
Selected emotion: 0
Emotion detected as neutral (row 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 113ms/step
Selected emotion: 1
Emotion detected as happy (col 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (0, 1) is already taken.
|O|O|X|
|X|O| |
|X|X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 117ms/step
Selected emotion: 1
```

```
Emotion detected as happy (row 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 42ms/step
Selected emotion: 0
Emotion detected as neutral (col 0). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (1, 0) is already taken.
|O|O|X|
|X|O| |
|X|X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
1/1 [==============================] - 0s 43ms/step
Selected emotion: 1
Emotion detected as happy (row 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 59ms/step
Selected emotion: 1
Emotion detected as happy (col 1). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Position (1, 1) is already taken.
|O|O|X|
|X|O| |
|X|X| |
Turn: O
reference:
row 0 is neutral.
row 1 is happy.
row 2 is surprise.
```

```
1/1 [==============================] - 0s 51ms/step
Selected emotion: 2
Emotion detected as surprise (row 2). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

reference:
col 0 is neutral.
col 1 is happy.
col 2 is surprise.
1/1 [==============================] - 0s 42ms/step
Selected emotion: 2
Emotion detected as surprise (col 2). Enter 'text' to use text input instead (0, 1 or 2). Otherwise,
press Enter to continue.

Player O took position (2, 2).
|O|O|X|
|X|O| |
|X|X|O|
```

Player O has won!

Our _get_emotion() code:

```
def _get_emotion(self, img) -> int:
    # Load the pre-trained model
    model = models.load_model('results/70_percent_accuracy.keras')

    # Resize the image to the size expected by the model
    rgb = cv2.cvtColor(img, cv2.COLOR_GRAY2RGB)
    rgb = cv2.resize(rgb, (150, 150))
    rgb = np.expand_dims(rgb, axis=0)

    # Predict the emotion
    predictions = model.predict(rgb)
    print(predictions)

    if predictions[0][0] > predictions[0][1] and predictions[0][0] > predictions[0][2]:
      emotion = 0  # neutral
    elif predictions[0][1] > predictions[0][0] and predictions[0][1] > predictions[0][2]:
      emotion = 1  # happy
    else:
      emotion = 2  # surprise

    print("Selected emotion:", emotion)

    # Return an integer (0, 1, or 2) neutral, happy, surprice
    return emotion
```

Answers to these questions:

1) How well did your interface work?
    a) Most of the time there was some confusion with recognizing our facial expressions. But, in the end, we were able to win!
2) Did it recognize your facial expressions with the same accuracy as it achieved against the test set?
    a) We believed that the facial expression accuracy was about the same as achieved in the test set. There were difficulties expressing the surprised expression, but after some trial and error, we figured out the trick and we ended up winning.
3) If not, why not?
    a) Because of the trial and error we mention from above, we thought it affected the accuracy. However, after looking back at section 6's result, which has 70% accuracy we notice that our model performs correctly fewer times on surprise than the other two emotions. Therefore, our accuracy for facial tic tac toe stayed the same as the previous section.