Coding Assignment 3

1. The format and content of the output is not a suggestion – it is the specification given to you to follow so please follow it exactly. Points will be lost for not following the specification. Formatting the output to look exactly the same is part of exercises in this assignment.

2. Please note that part of the rubric is ***how*** you coded the program in addition to outputting valid responses. Be sure to review the rubric before submitting your code.

3. Make sure your name and student id are in a comment in the first line of your program.

4. Name your program `Code3_studentid.c` and name the zip file `Code3_studentid.zip` for submission to Canvas.

This assignment is about simulating a bingo game. If you are unfamiliar with how bingo is played, please see this YouTube link describing the game and how it is played.

https://youtu.be/grzRsplu5ac

This Wikipedia article describes the rules of the game and the layout of the cards. We will be using a 5x5 bingo card.

https://en.wikipedia.org/wiki/Bingo_(American_version)

Pseudocode

Create a 2D array that will be your bingo card. The bingo card will ONLY be 5x5.

Make sure your random numbers are truly random between program runs.

Create a function to fill the bingo card with random numbers in the proper ranges. Pass your 2D bingo array to this function to be populated. Be sure to mark the free spot.

The 'B' column contains numbers between 1 and 15

The 'I' column contains numbers between 16 and 30

The 'N' column contains numbers between 31 and 45

The 'G' column contains numbers between 46 and 60

The 'O' column contains numbers between 61 and 75

Just a reminder - BINGO numbers MUST be unique. You cannot have the same number in multiple cells of your BINGO card. The rules of BINGO state that every number is unique.

Create a function to print the bingo card to the screen. You must match the formatting shown in the sample output. The bingo array must be passed to this function.

Create a function to pick a number that has not already been chosen. You will need to use a 1D array to keep track of which numbers between 1 and 75 have been used so that you don't pick numbers that have already been called. If you randomly pick a number that was already called, then pick another. Continue this process until you find a number that has not been previously called. Print the number to the screen along with its corresponding letter. This function should return that value.

Create a function to determine if a called number exists in the player's bingo card. Pass the bingo array and the number to the function. Loop over the array (nested for loops) and, if the number is found in the bingo array, then change the value to 0 to "mark" it. If the number is found, then this function should return true; otherwise, return false.

Create a function to check for a completed row. A completed row is a row in the bingo array that has 0 for every value (we "marked" our bingo numbers by changing the existing value to zero to indicate that the called number matches one in our bingo card). This function should check every row in the bingo array and return whether or not it found a completed row.

Create a function to check for a completed column. A completed column is a column in the bingo array that has 0 for every value (we "marked" our bingo numbers by changing the existing value to zero to indicate that the called number matches one in our bingo card). This function should check every column in the bingo array and return whether or not it found a completed column.

Add prototypes for the functions at the top of the program.

`main()`

Call function to fill bingo card

Call function to print bingo card to screen

While the player has not won and while there are still numbers to chose from (there are 75 total)

Call a function to pick a number that has not been chosen already – this function returns the called number.

Show the player the number (including the B, I, N, G or O) and ask if the player has that number on their bingo card.

If the player answers anything other than something that begins with 'Y', then reprint the bingo card and increment the count of numbers drawn so far.

If the player answers something that begins with 'Y', then

Call a function to determine if the number drawn IS a number from the bingo card.

If the function returns false, then print the message about cheating.

If the function returns true, then call a function to check for a completed row and a function to check for a completed column. If a completed row and/or column is found, then the player has won and a message should print and the game should end. 10% bonus – add another function to check for a completed diagonal.

Screenshot when player answers Y to a number that is not on the bingo card.

```
    B        I        N        G        O
-----------------------------------------
|  12   |  21   |  43   |  54   |  73   |
-----------------------------------------
|  10   |  17   |  33   |  53   |  69   |
-----------------------------------------
|   7   |  24   |   X   |  59   |  61   |
-----------------------------------------
|   5   |  26   |  38   |  55   |  67   |
-----------------------------------------
|   6   |  23   |  42   |  51   |  62   |
-----------------------------------------

The next number is O65

Do you have it? (Y/N)Y

That value is not on your BINGO card - are you trying to cheat??
```

Screenshot when player answers n to a number that is not on the bingo card.

```
    B        I        N        G        O
-----------------------------------------
|  12   |  21   |  43   |  54   |  73   |
-----------------------------------------
|  10   |  17   |  33   |  53   |  69   |
-----------------------------------------
|   7   |  24   |   X   |  59   |  61   |
-----------------------------------------
|   5   |  26   |  38   |  55   |  67   |
-----------------------------------------
|   6   |  23   |  42   |  51   |  62   |
-----------------------------------------

The next number is O72

Do you have it? (Y/N)N


    B        I        N        G        O
-----------------------------------------
|  12   |  21   |  43   |  54   |  73   |
-----------------------------------------
|  10   |  17   |  33   |  53   |  69   |
-----------------------------------------
|   7   |  24   |   X   |  59   |  61   |
```

```
-----------------------------------------
|   5   |  26   |  38   |  55   |  67   |
-----------------------------------------
|   6   |  23   |  42   |  51   |  62   |
-----------------------------------------
```

Screenshot when player answers y to a number that is on the bingo card. Player's answer must start with capital Y to be considered positive.

```
    B       I       N       G       O
-----------------------------------------
|  12   |  21   |  43   |  54   |  73   |
-----------------------------------------
|  10   |  17   |  33   |  53   |  69   |
-----------------------------------------
|   7   |  24   |   X   |  59   |  61   |
-----------------------------------------
|   5   |  26   |  38   |  55   |  67   |
-----------------------------------------
|   6   |  23   |  42   |  51   |  62   |
-----------------------------------------

The next number is B6

Do you have it? (Y/N)y


    B       I       N       G       O
-----------------------------------------
|  12   |  21   |  43   |  54   |  73   |
-----------------------------------------
|  10   |  17   |  33   |  53   |  69   |
-----------------------------------------
|   7   |  24   |   X   |  59   |  61   |
-----------------------------------------
|   5   |  26   |  38   |  55   |  67   |
-----------------------------------------
|   6   |  23   |  42   |  51   |  62   |
-----------------------------------------
```

Screenshot when player wins by filling out both a column and row.

```
    B       I       N       G       O
-----------------------------------------
|   X   |   X   |   X   |  60   |   X   |
-----------------------------------------
|   X   |   X   |  33   |   X   |   X   |
-----------------------------------------
|   X   |  19   |   X   |   X   |   X   |
```

```
----------------------------------------
|   X   |   X   |  35   |   X   |   X   |
----------------------------------------
|   2   |   X   |   X   |   X   |  72   |
----------------------------------------

The next number is I19

Do you have it? (Y/N)Y


    B       I       N       G       O
----------------------------------------
|   X   |   X   |   X   |  60   |   X   |
----------------------------------------
|   X   |   X   |  33   |   X   |   X   |
----------------------------------------
|   X   |   X   |   X   |   X   |   X   |
----------------------------------------
|   X   |   X   |  35   |   X   |   X   |
----------------------------------------
|   2   |   X   |   X   |   X   |  72   |
----------------------------------------


You filled out a row and a column - BINGO!!!
```

Screenshot when player wins by filling out a row.

```
    B       I       N       G       O
----------------------------------------
|   9   |  17   |  32   |   X   |  68   |
----------------------------------------
|  12   |  23   |   X   |   X   |   X   |
----------------------------------------
|   X   |  26   |   X   |   X   |   X   |
----------------------------------------
|   X   |   X   |  37   |  46   |  75   |
----------------------------------------
|   X   |  24   |   X   |   X   |   X   |
----------------------------------------

The next number is I24

Do you have it? (Y/N)

    B       I       N       G       O
----------------------------------------
|   9   |  17   |  32   |   X   |  68   |
----------------------------------------
```

```
|  12   |  23   |   X   |   X   |   X   |
----------------------------------------
|   X   |  26   |   X   |   X   |   X   |
----------------------------------------
|   X   |   X   |  37   |  46   |  75   |
----------------------------------------
|   X   |   X   |   X   |   X   |   X   |
----------------------------------------


You filled out a row - BINGO!!!
```

Screenshot when player wins by filling out a column.

```
    B       I       N       G       O
----------------------------------------
|   X   |   X   |  35   |  58   |   X   |
----------------------------------------
|   X   |  30   |  31   |   X   |  67   |
----------------------------------------
|  10   |  18   |   X   |  54   |   X   |
----------------------------------------
|   X   |  29   |  37   |   X   |   X   |
----------------------------------------
|   8   |   X   |  44   |  60   |   X   |
----------------------------------------

The next number is O67

Do you have it? (Y/N)

    B       I       N       G       O
----------------------------------------
|   X   |   X   |  35   |  58   |   X   |
----------------------------------------
|   X   |  30   |  31   |   X   |   X   |
----------------------------------------
|  10   |  18   |   X   |  54   |   X   |
----------------------------------------
|   X   |  29   |  37   |   X   |   X   |
----------------------------------------
|   8   |   X   |  44   |  60   |   X   |
----------------------------------------


You filled out a column - BINGO!!!
```