Pattern Print Shop
Due date: 04/12/24

Team: Group 14

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Project Report: Programming Project 1 - Pattern Print Shop

1. **Goal:**
   The goal of this project is to create a program that will act as a pattern print shop and will ask the user a series of questions and depending on the user's input it will determine which functions will be called.

2. **Problem Description:**
   We will have to write a Python code that will perform pattern printing for the Pattern Print Shop. The code should output a menu to choose the pattern to be printed. As the user selects the pattern, we will ask the user about the needed dimension, making sure it is a valid positive integer, and then print the patterns.
3. **Program Description:**
   a. *Typed Solution*
      i. Program will display a menu asking the user to chose an option A-C and Q as an exit option
      ii. If user picks A the user will be presented with the type of rectangle they want (either 1 hollow, 2 solid or 0 to return to the main menu)
      iii. If the user selects 1 then they will be asked to enter the parameters of the triangle and the symbol of their choice
      iv. The user is then presented the main menu again
      v. If the user were to pick A (rectangle) but picked the solid triangle they will be asked to enter the parameters of the triangle and the symbol of their choice
      vi. If the user were to pick B (Pyramid) they will be presented with the pyramid menu and asked to select options (1,2 or 0 to quit)
      vii. If the user picks 1 it will take the user to the half pyramid menu to have them select an option between(Half Pyramid, Inverted half pyramid or a hollow Inverted pyramid)

viii. If the user picks any of those options they will then be prompted to enter the parameters of the pyramid and the symbol they would like to use

ix. If the user picked option 2(Full pyramid) they will be asked to chose the type of pyramid (Full Pyramid, inverted full pyramid or the hollow inverted pyramid)

x. Depending on the users input they will then be prompted to enter the selected pyramids parameters and their desired symbol.

xi. If the user picks option C the Diamond, they will be presented with the diamond menu to chose between the solid or hollow diamond and will be asked to enter the parameters of the diamond and will print.

b. ***Pseudo Code:***

Print a statement welcoming the user to the print shop and asking them to select an option from the menu.
input ask the user to select an option in order to grab their input

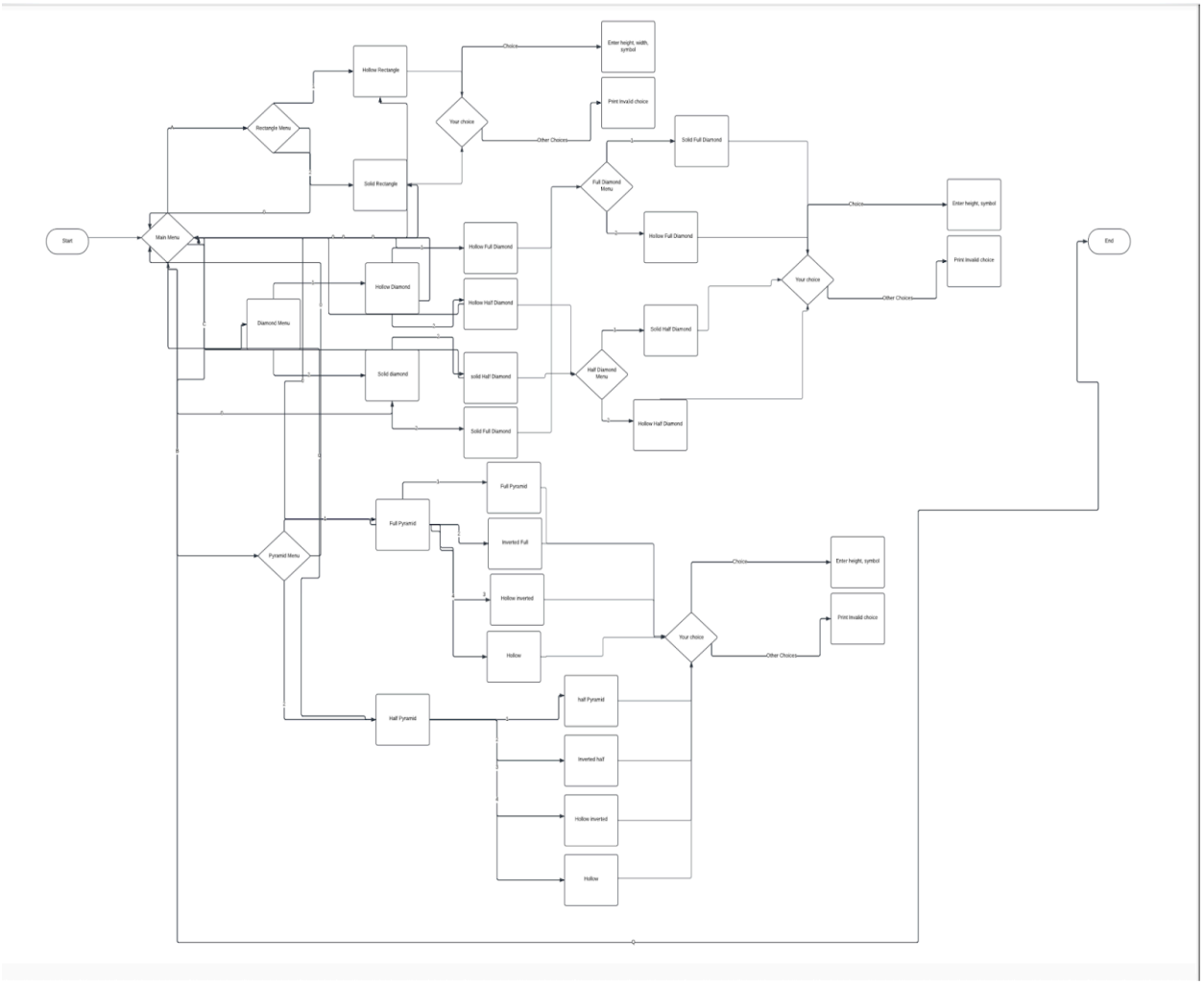
Predefine the Def functions according to what they are supposed to do

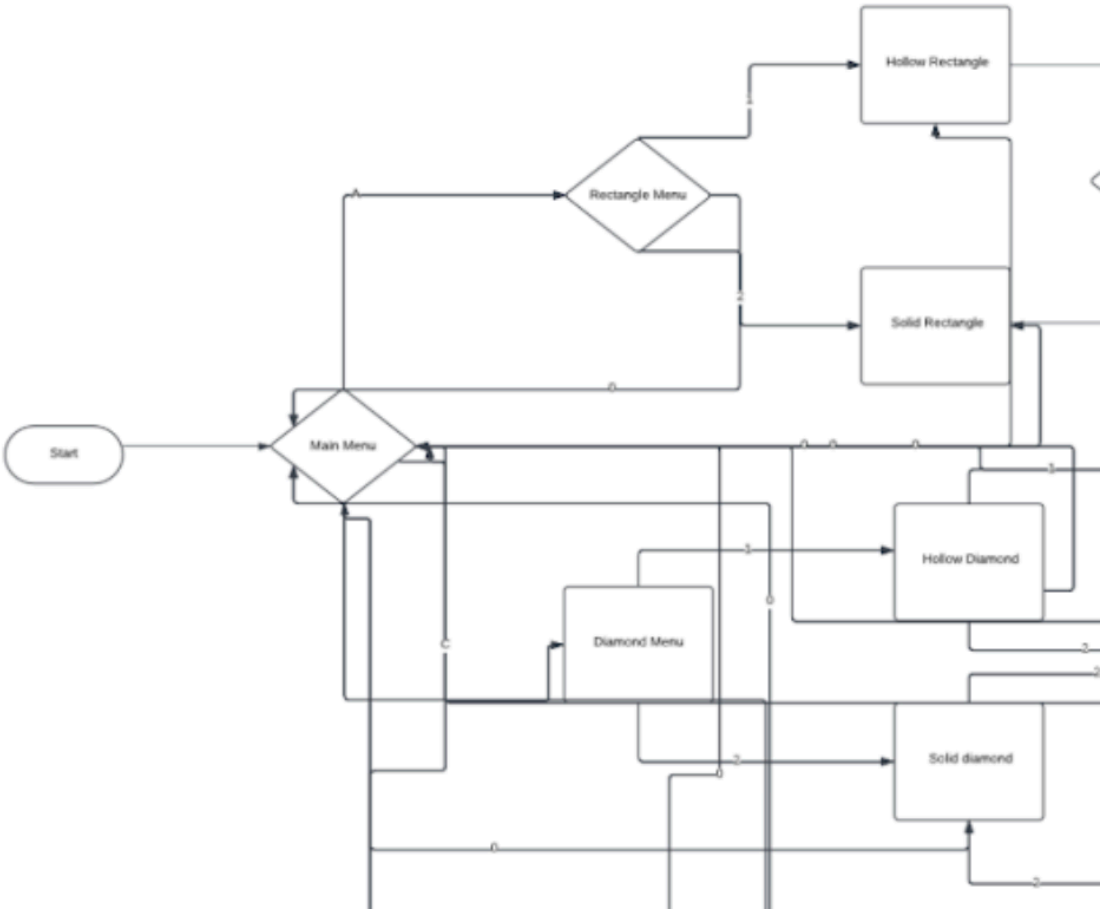
```
If user input  does not equals 1,2 or 0:
        Reprint menu and ask the user to give an input
If user input equals A:
        Print the rectangle menu
        print: ask user for another input
        If user choice equals 1:
                Ask user for the height width and the symbol they want
                Print the hollow rectangle
        Elif user choice equals 2:
                Ask user for the height width and the symbol they want
                Print the solid rectangle
        Elif user choice equals 0:
                Go back to main menu
Elif user input equals B:
        Print pyramid menu
        Ask for user input
        If user input = 1:
                Print half pyramid menu
                Ask for user input
                if userinput = 1:
                        Ask user to input height and symbol
                        Print solid half pyramid
                Elif user input = 2:
                        Ask user to input height and symbol
                        Print solid inverted half pyramid
                Elif user input = 3:
                        Ask user to input height and symbol
```

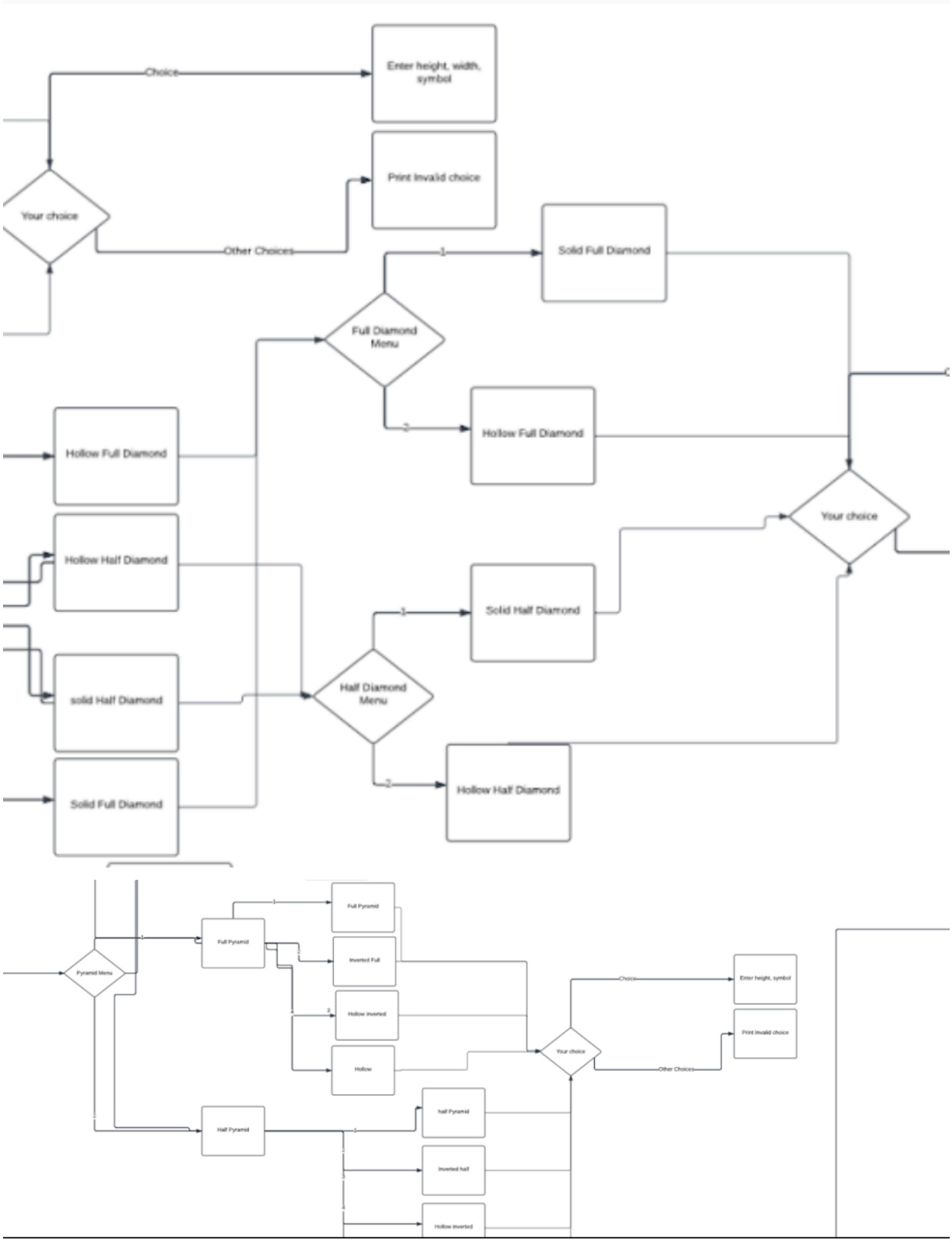
```
                    Print hollow inverted pyramid
                Elif user input = 0:
                    Return to the menu
                Else print invalid choice
            Elif user input = 2:
                Print the full pyramid menu
                Ask user for input (1,2,0)
                If  user input equals 1:
                    Ask user for height symbol
                    Print full pyramid
                Elif user input equals 2:
                    Ask user to input height and symbol
                    Print  full inverted pyramid
                Elif user input equals 3:
                    Ask user to input height and symbol
                    Print  hollow inverted pyramid
                Elif user input equals 0:
                    Continue
                Else:
                    Print invalid choice

Elif user input equals C:
        Print Diamond menu
        Ask User for input
        If user input equals 1:
            Ask user for size of diamond and symbol of choice
            Print full diamond
        Elif user input equals 2:
            Ask user for size of diamond and symbol of choice
            Print half diamond
        Elif user input equals 0:
            continue
        Else :
            Print invalid choice
Elif User input equals Q:
        Print thank you for your business
Else:
        print invalid choice
```

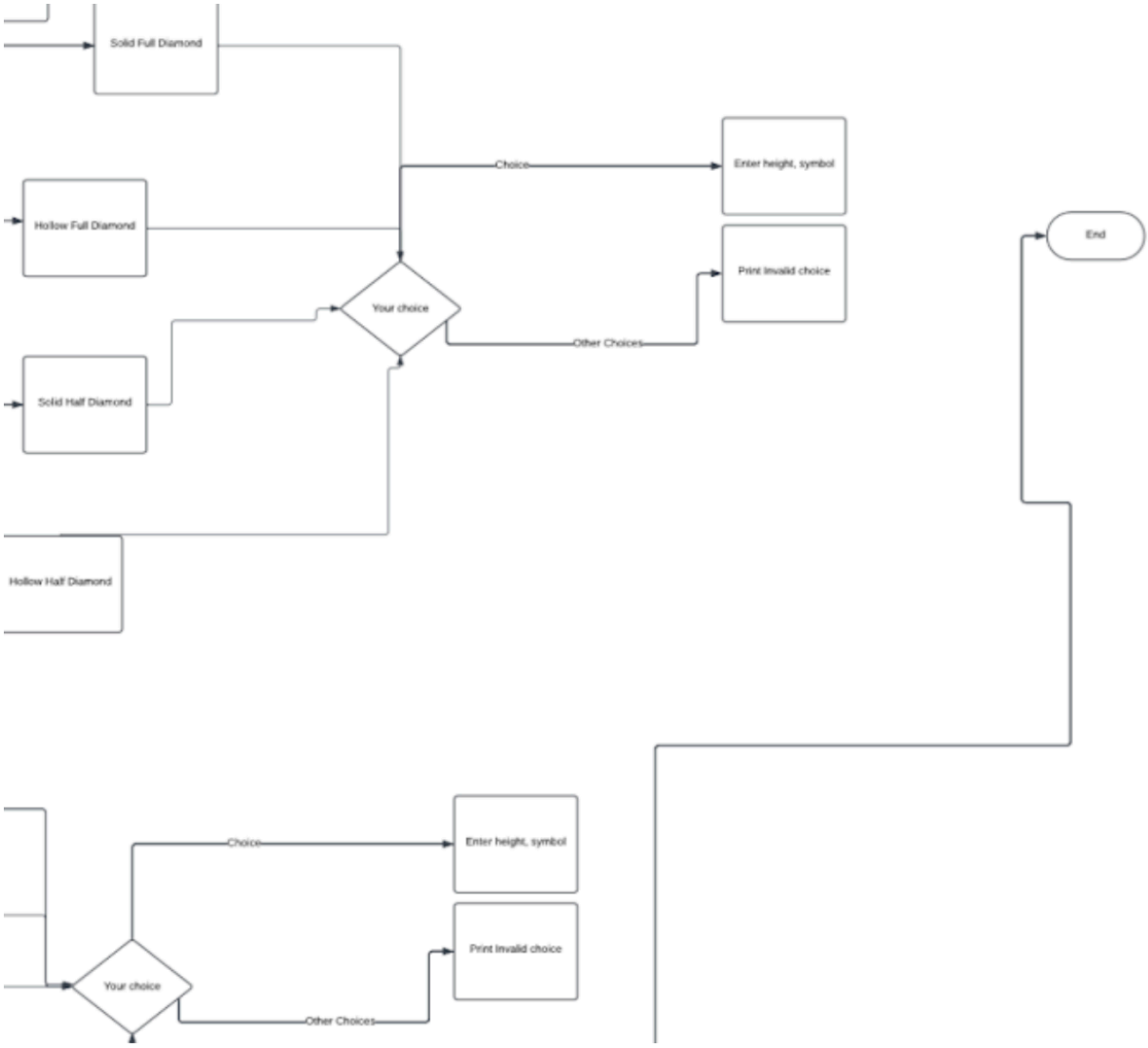
c. *Top-down-design diagram & Flowchart*

https://lucid.app/lucidchart/84c131e3-01c8-4463-987a-5eee8e32b542/edit?viewport_loc=-2628%2C3633%2C4127%2C1584%2C0_0&invitationId=inv_d6d6c9a9-d237-4fa1-bebc-627d2ddb40e8

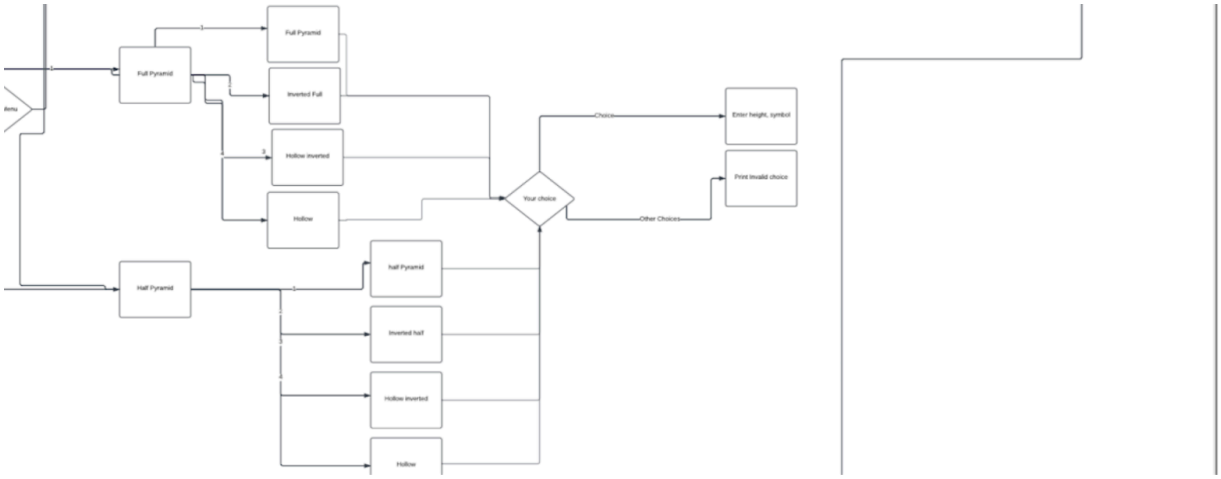



Hollow Rectangle
Rectangle Menu
Solid Rectangle
Start
Main Menu
Hollow Diamond
Diamond Menu
Solid diamond


Choice
Enter height, width, symbol
Your choice
Print Invalid choice
Other Choices
1
Solid Full Diamond
Full Diamond Menu
2
Hollow Full Diamond
Hollow Full Diamond
Hollow Half Diamond
Your choice
Solid Half Diamond
1
Half Diamond Menu
solid Half Diamond
2
Hollow Half Diamond
Solid Full Diamond
Full Pyramid
Pyramid Menu
Full Pyramid
Inverted Full
Hollow inverted
Hollow
Your choice
Choice
Enter height, symbol
Print invalid choice
Other Choices
Half Pyramid
half Pyramid
Inverted half
Hollow inverted


Solid Full Diamond
Hollow Full Diamond
Solid Half Diamond
Hollow Half Diamond
Your choice
Choice
Other Choices
Enter height, symbol
Print Invalid choice
End

Your choice
Choice
Other Choices
Enter height, symbol
Print Invalid choice


Full Pyramid
Inverted Full
Hollow Inverted
Hollow
Half Pyramid
Inverted half
Hollow Inverted
Hollow
Your choice
Choice
Other Choices
Enter height, symbol
Print Invalid choice

4. **Program Implementation:**
    a. We used int, print, if statements and an else statement def functions were used was used in this procedure.
    b. The only thing that seemed to be challenging was figuring out the if and elif statements
    c. What was interesting was the implementation of the shapes
    d. The program handles very well and will take any inputs and print out the correct shapes.
    e. No bugs were found everything ran well

5. **Conclusion:**

By doing this report, we had learned, not just how to program, but also how to translate the work that was done onto a report. While programming is an important component, as the report relies on it, the report itself made us take a deeper look into what we had created, and showed us the work required to then move on to coding. The flowchart and top down design diagram shows a visual representation of what we wanted our program to be, and it made us feel more involved with this project.

Appendix:

Project 4 code:

```
def main_menu():
    """ printing the main menu"""
    print("Welcome to Pattern Print Shop. Please select from the following menu:")
    print("A- To print a rectangle")
    print("B- To print Pyramid pattern")
    print("C- To print Diamond Pattern")
    print("Q- To quit")
    print("Please enter a valid symbol.")

def rectangle_menu():
    print("Please select the type of rectangle:")
    print("1- Hollow Rectangle")
    print("2- Solid Rectangle")
    print("0- Return to main menu")
```

```
def hollow_rectangle(symbol, height, width):
    for i in range(height):
        for j in range(width):
            if i == 0 or i == height - 1 or j == 0 or j == width - 1:
                print(symbol, end="")
            else:
                print(" ", end="")
        print()

def solid_rectangle(symbol, height, width):
    for i in range(height):
        for j in range(width):
            print(symbol, end="")
        print()

def pyramid_menu():
    print("Please select the type of pyramid:")
    print("1- Half Pyramid")
    print("2- Full Pyramid")
    print("0- Return to main menu")

def half_pyramid(symbol, height):
    for i in range(1, height + 1):
        print(symbol * i)

def full_pyramid(symbol, height):
    for i in range(1, height + 1):
        print(" " * (height - i) + symbol * (2 * i - 1))

def solid_half_pyramid(symbol, height):
    for i in range(1, height + 1):
        print(symbol * i)

def hollow_half_pyramid(symbol, height):
    for i in range(1, height + 1):
        if i == 1 or i == height:
            print(symbol * i)
        else:
            print(symbol + " " * (i - 2) + symbol)
```

```
def solid_inverted_half_pyramid(symbol, height):
    for i in range(height, 0, -1):
        print(symbol * i)

def hollow_inverted_half_pyramid(symbol, height):
    for i in range(height, 0, -1):
        if i == height or i == 1:
            print(symbol * i)
        else:
            print(symbol + " " * (i - 2) + symbol)

def solid_full_pyramid(symbol, height):
    for i in range(1, height + 1):
print(" " * (height - i) + symbol * (2 * i - 1))

def hollow_full_pyramid(symbol, height):
    for i in range(1, height + 1):
        if i == 1 or i == height:
            print(" " * (height - i) + symbol * (2 * i - 1))
        else:
            print(" " * (height - i) + symbol + " " * (2 * (i - 1)) + symbol)

def solid_inverted_full_pyramid(symbol, height):
    for i in range(height, 0, -1):
        print(" " * (height - i) + symbol * (2 * i - 1))

def hollow_inverted_full_pyramid(symbol, height):
    for i in range(height, 0, -1):
        if i == height or i == 1:
            print(" " * (height - i) + symbol * (2 * i - 1))
        else:
            print(" " * (height - i) + symbol + " " * (2 * (i - 1)) + symbol)

def pyramid_type_menu():
    print("Please select the type of half pyramid:")
    print("1- Half Pyramid")
    print("2- Inverted Half Pyramid")
    print("3- Hollow Inverted Half Pyramid")
    print("0- Return to main menu")
```

```
def pyramid_type_menu2():
    print("Please select the type of half pyramid:")
    print("1- full Pyramid")
    print("2- Inverted full Pyramid")
    print("3- Hollow Inverted full Pyramid")
    print("0- Return to main menu")

def diamond_menu():
    print("Please select the type of diamond pattern:")
    print("1- Solid Diamond")
    print("2- Hollow Diamond")
    print("0- Return to main menu")

def solid_full_diamond(symbol, size):
    for i in range(1, size + 1):
        print(" " * (size - i) + symbol * (2 * i - 1))
    for i in range(size - 1, 0, -1):
        print(" " * (size - i) + symbol * (2 * i - 1))

def hollow_full_diamond(symbol, size):
    for i in range(1, size + 1):
        if i == 1 or i == size:
            print(" " * (size - i) + symbol * (2 * i - 1))
        else:
            print(" " * (size - i) + symbol + " " * (2 * (i - 1)) + symbol)

def solid_half_diamond(symbol, size):
    for i in range(1, size + 1):
        print(" " * (size - i) + symbol * i)
def hollow_half_diamond(symbol, size):
    for i in range(1, size + 1):
        if i == 1 or i == size:
            print(" " * (size - i) + symbol * i)
        else:
            print(" " * (size - i) + symbol + " " * (i - 2) + symbol)



def main():
    while True:
```

```
main_menu()
choice = input("Your choice: ").upper()
if choice == "A":
    rectangle_menu()
    rect_choice = input("Your choice: ")
    if rect_choice == "1":
        height = int(input("Enter the height of the rectangle: "))
        width = int(input("Enter the width of the rectangle: "))
        symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
        hollow_rectangle(symbol, height, width)
    elif rect_choice == "2":
        height = int(input("Enter the height of the rectangle: "))
        width = int(input("Enter the width of the rectangle: "))
        symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
        solid_rectangle(symbol, height, width)
    elif rect_choice == "0":
        continue
    else:
        print("Invalid choice")
elif choice == "B":
    pyramid_menu()
    pyramid_choice = input("Your choice: ")
    if pyramid_choice == "1":
        pyramid_type_menu()
        pyramid_type_choice = input("Your choice: ")
        if pyramid_type_choice == "1":
            height = int(input("Enter the height of the pyramid: "))
            symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
            solid_half_diamond(symbol, height)
            if eval(symbol) == int():


        elif pyramid_type_choice == "2":
            height = int(input("Enter the height of the pyramid: "))
            symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
            solid_inverted_half_pyramid(symbol, height)
        elif pyramid_type_choice == "3":
            height = int(input("Enter the height of the pyramid: "))
            symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
            hollow_inverted_half_pyramid(symbol, height)
```

```
            elif pyramid_type_choice == "0":
                continue
            else:
                print("Invalid choice")
        elif pyramid_choice == "2":
            pyramid_type_menu2()
            pyramid_type_choice = input("Your choice: ")
            if pyramid_type_choice == "1":
height = int(input("Enter the height of the pyramid: "))
                symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
                solid_full_pyramid(symbol, height)
            elif pyramid_type_choice == "2":
                height = int(input("Enter the height of the pyramid: "))
                symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
                solid_inverted_full_pyramid(symbol, height)
            elif pyramid_type_choice == "3":
                height = int(input("Enter the height of the pyramid: "))
                symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
                hollow_inverted_full_pyramid(symbol, height)
            elif pyramid_type_choice == "0":
                continue
            else:
                print("Invalid choice")
        elif pyramid_choice == "0":
            continue
        else:
            print("Invalid choice")
    elif choice == "C":
        diamond_menu()
        diamond_choice = input("Your choice: ")
        if diamond_choice == "1":
            size = int(input("Enter the size of the diamond: "))
            symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
            solid_full_diamond(symbol, size)
        elif diamond_choice == "2":
            size = int(input("Enter the size of the diamond: "))
            symbol = input("Enter the symbol to use (!, @, #, $, %, ^, &, *): ")
            hollow_full_diamond(symbol, size)
        elif diamond_choice == "0":
            continue
```

```
            else:
                print("Invalid choice")
        elif choice == "Q":
            print("Thank you for your Business")
            break
        else:
            print("Invalid choice")

if __name__ == "__main__":
    main()
```

Project 4 Outputs: