Foundation Certificate for Higher Education

Module: Doc 333 – Introduction to Programming - 1

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Assessment Type: Individual Coursework

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Title: Developing the Hidden Peg Game in Python

I. Acknowledgement

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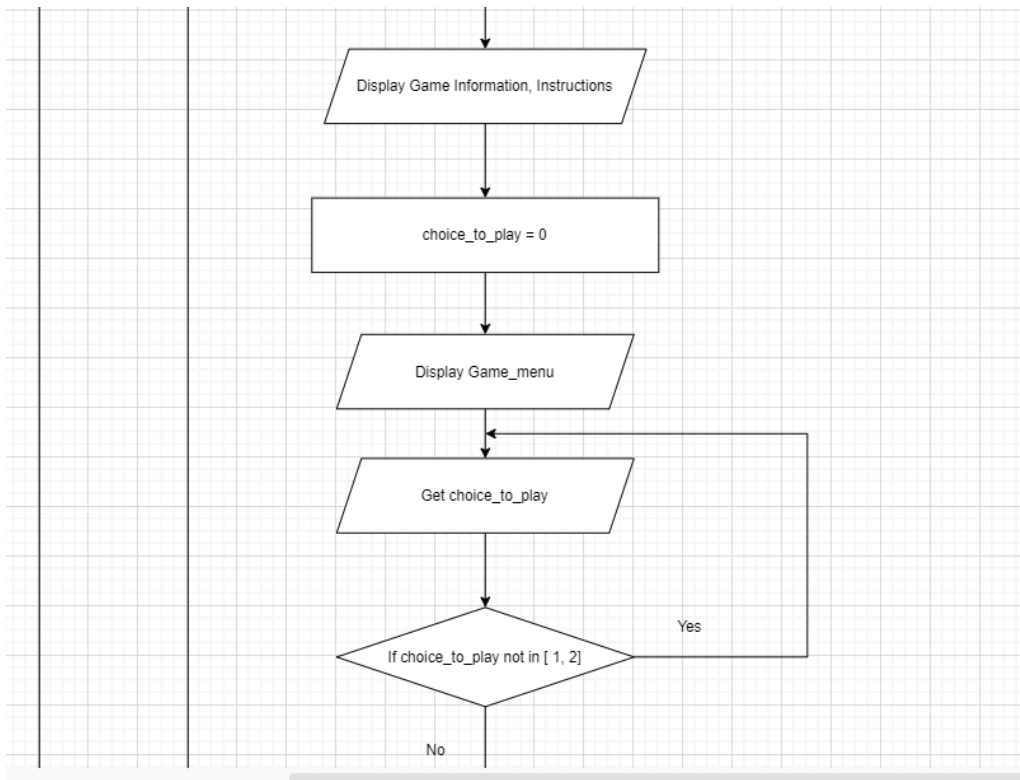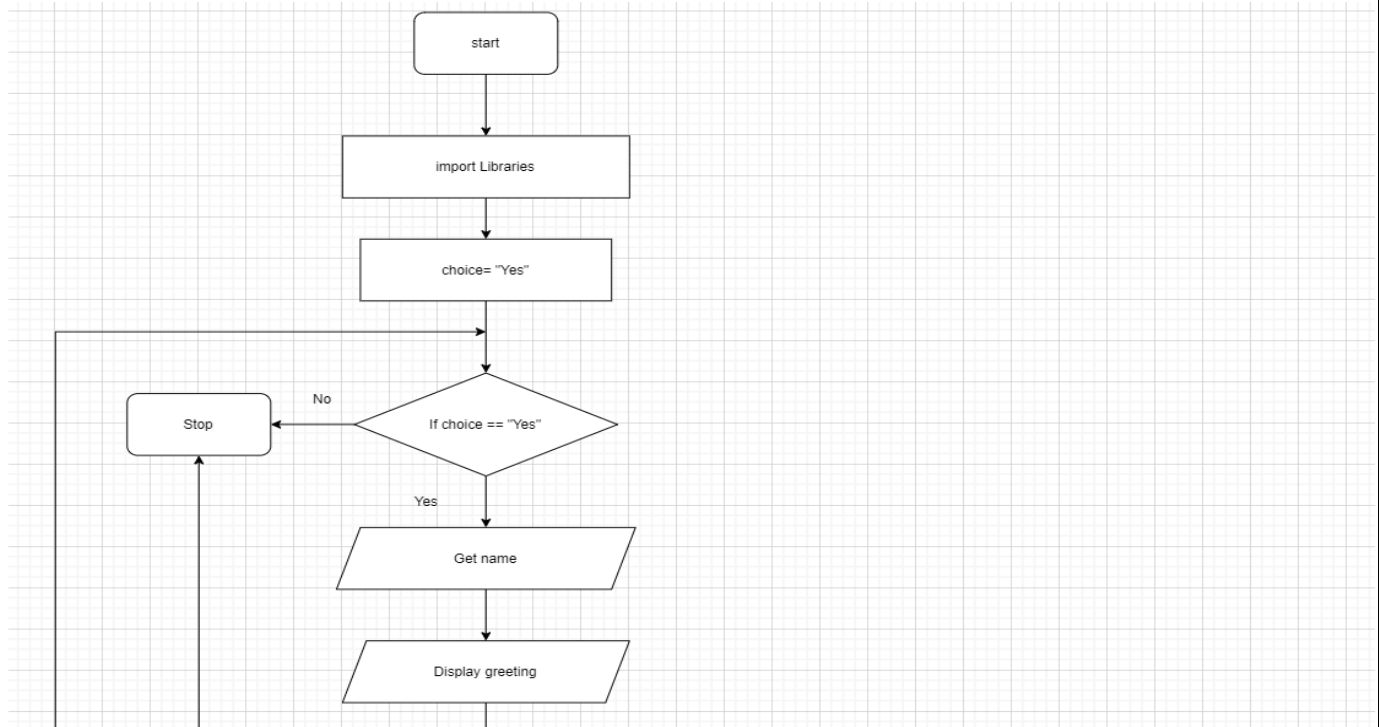# Table of Contents

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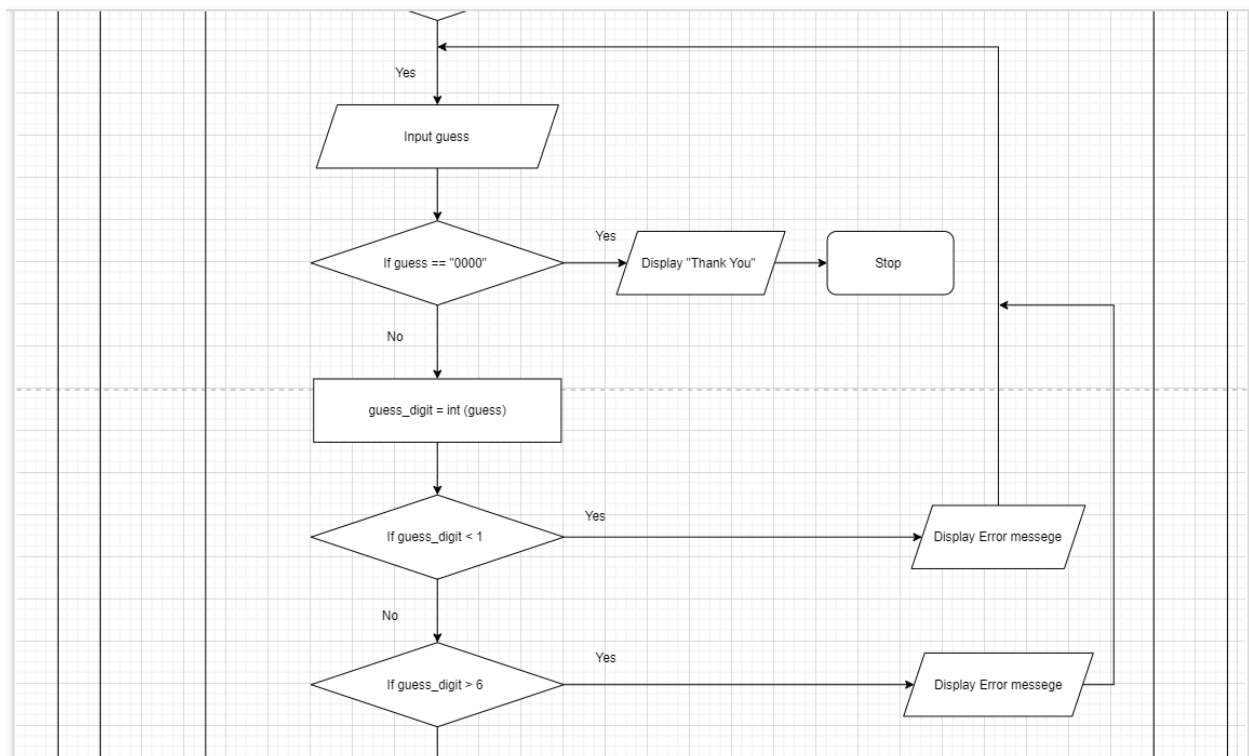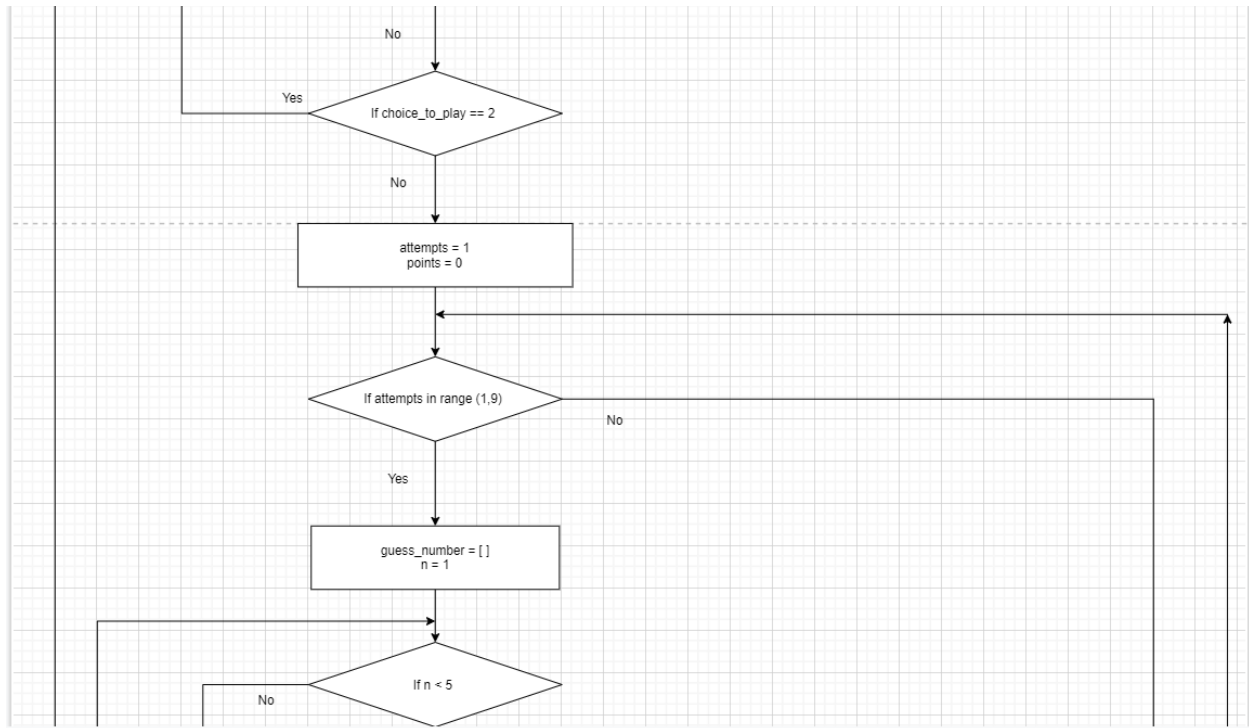
1. Introduction to the Problem

The game is between the code maker who utilizes the software and the code breaker who plays the game by guessing 4-digit numbers to break the hidden number. The system will play as the code maker, and it secretly puts 4 colored pegs (The System generates a 4-digit random number where each digit is from range 1 to 6 and each number represents a color. E.g., 1- White, 2-Blue, 3-Red, 4 –Yellow, 5-Green, 6- Purple). The code breaker (user) has eight attempts to guess the hidden random number. He should enter a 4-digit number at each attempt and should be able to terminate the game without going into 8th guess (if he/she wishes) by entering '0000' as the guess.
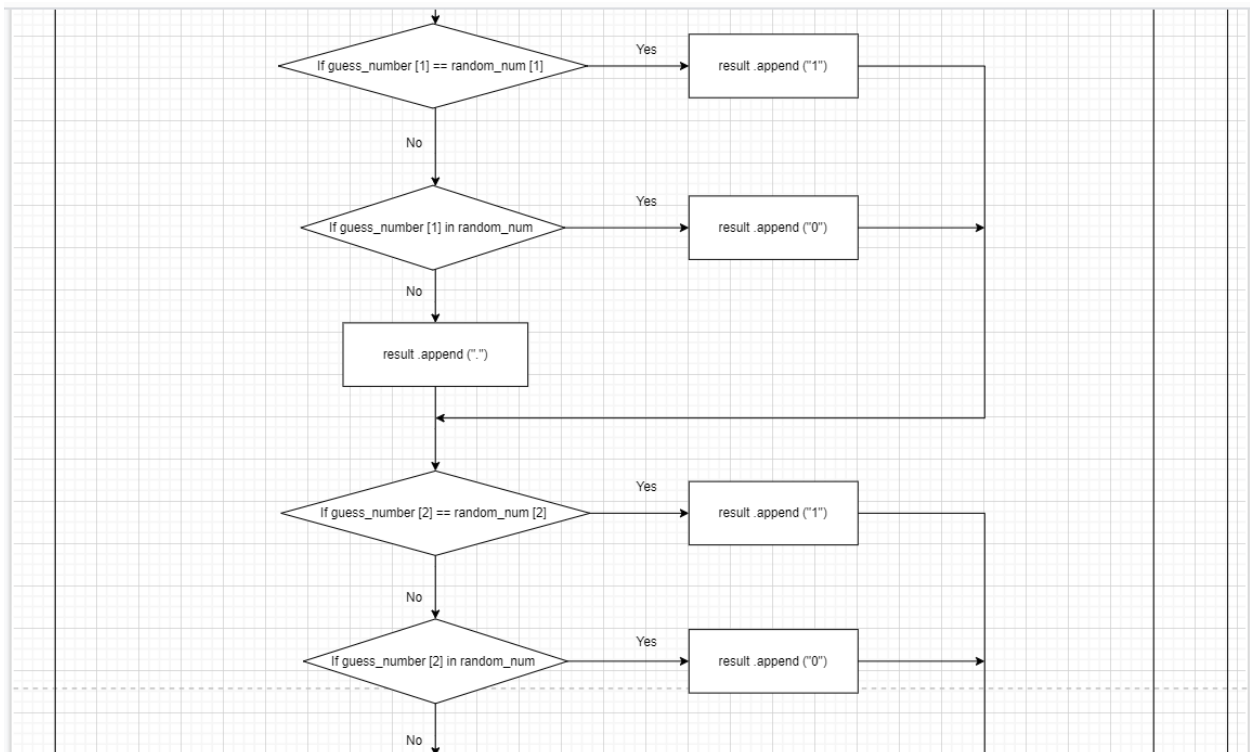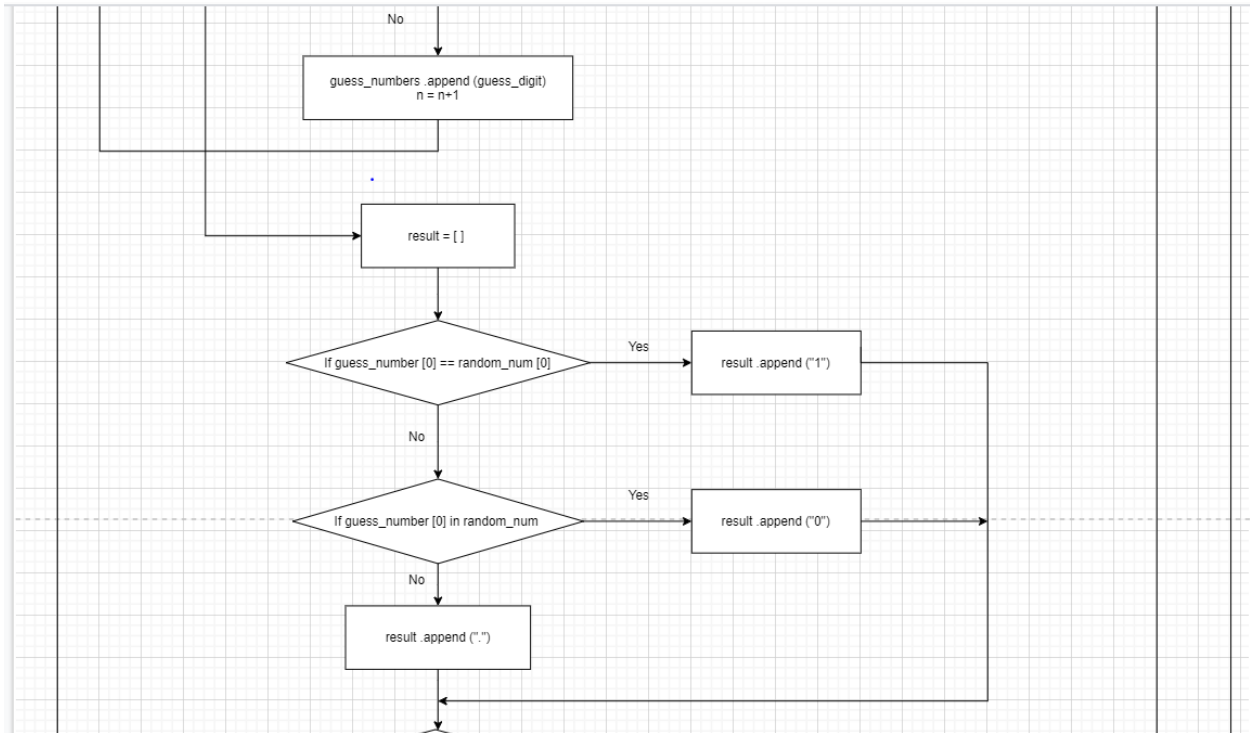
After each guess done by the user, the system checks the similarity between the guessed number (user input) and random number (system generated number). Then it uses small pegs (the system represents 'zero' for white pegs, 'one' for black pegs) to inform the code breaker if the guessed digits are correct and in the right place or correct but in the wrong place or the wrong digit entirely. If the guessed digit is correct and in the right place, then the system displays '1', the guessed digit is correct but in the wrong place then system displays '0' and if it is wrong digit entirely then the system displays '.'.
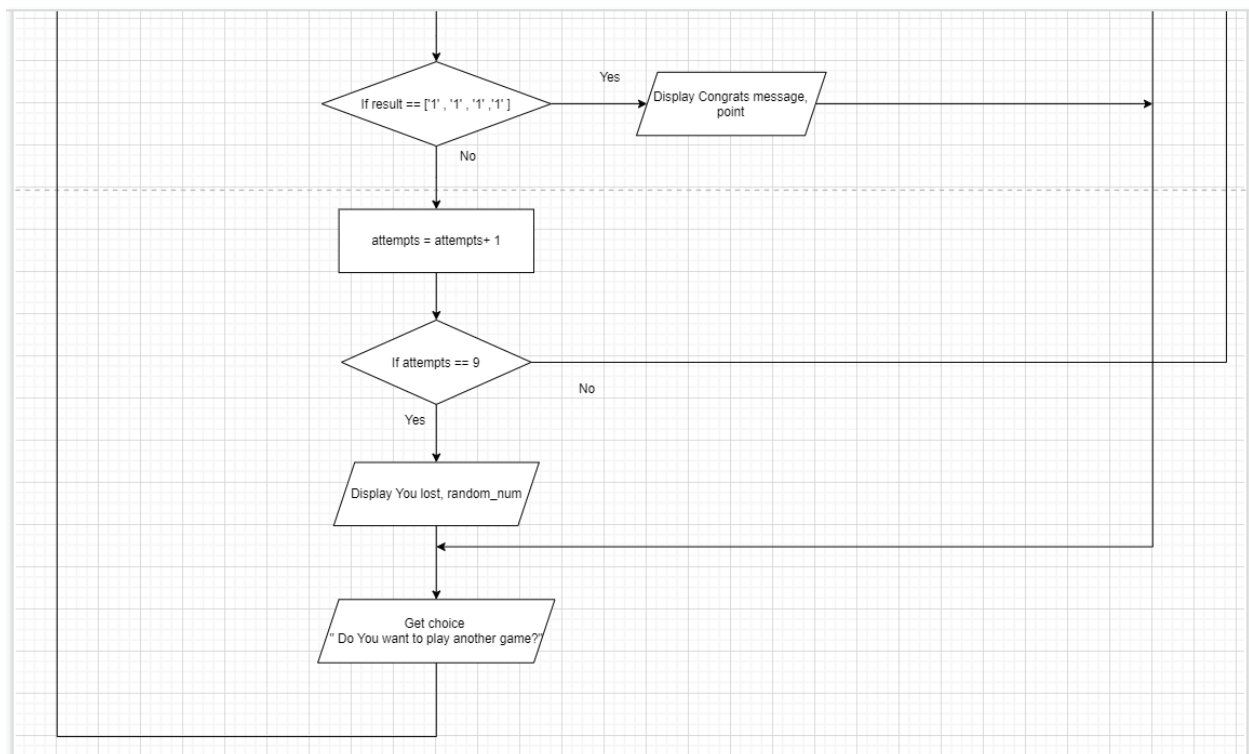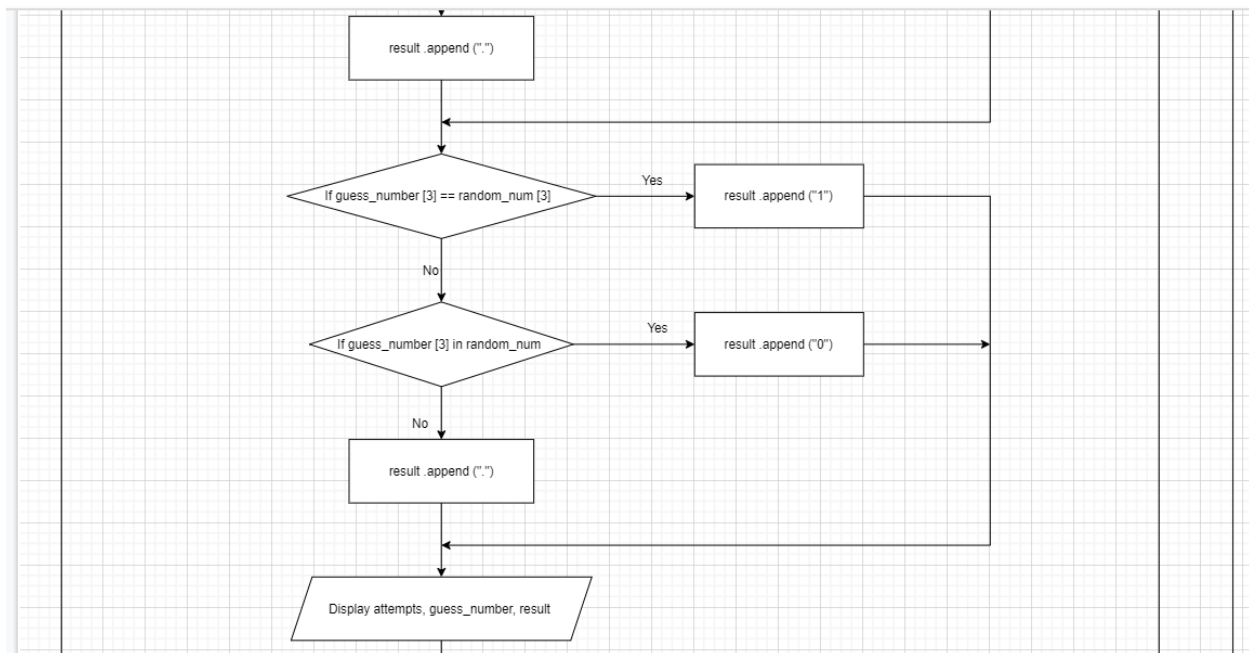
To win the game, the user should enter all four digits correctly with the correct order. Then the system displays '1 1 1 1' as the result. The system calculates the marks according to the number of attempts that the user played. If the user wins at the 1st attempt, he receives 100 marks. Otherwise, the system subtracts 12.5 points for each attempt from 100 to calculate his marks.

2. Flowchart of the Problem

```
                          ┌─────────────┐
                          │    start    │
                          └──────┬──────┘
                                 │
                          ┌──────▼──────┐
                          │ import Libraries │
                          └──────┬──────┘
                                 │
                          ┌──────▼──────┐
                          │ choice= "Yes" │
                          └──────┬──────┘
                                 │
                  No     ┌────────▼────────┐
    ┌───────┐  ◄─────────┤ If choice == "Yes" │
    │ Stop  │            └────────┬────────┘
    └───────┘                     │ Yes
                          ┌────────▼────────┐
                          │    Get name     │
                          └────────┬────────┘
                                   │
                          ┌────────▼────────┐
                          │ Display greeting │
                          └─────────────────┘
```

```
                 ┌──────────────────────────────────┐
                 │ Display Game Information, Instructions │
                 └──────────────────┬───────────────┘
                                    │
                          ┌─────────▼─────────┐
                          │ choice_to_play = 0 │
                          └─────────┬─────────┘
                                    │
                          ┌─────────▼─────────┐
                          │ Display Game_menu  │
                          └─────────┬─────────┘
                                    │
                          ┌─────────▼─────────┐
                          │ Get choice_to_play │◄────────┐
                          └─────────┬─────────┘          │
                                    │                    │ Yes
                        ┌───────────▼──────────────┐     │
                        │ If choice_to_play not in [ 1, 2] ├─────┘
                        └───────────┬──────────────┘
                                    │ No
```

No

Yes → If choice_to_play == 2

No

attempts = 1
points = 0

If attempts in range (1,9) → No

Yes

guess_number = [ ]
n = 1

No ← If n < 5

Yes

Input guess

If guess == "0000" → Yes → Display "Thank You" → Stop

No

guess_digit = int (guess)

If guess_digit < 1 → Yes → Display Error messege

No

If guess_digit > 6 → Yes → Display Error messege

3

No

```
guess_numbers .append (guess_digit)
n = n+1
```

result = [ ]

If guess_number [0] == random_num [0] ──Yes──► result .append ("1")

No

If guess_number [0] in random_num ──Yes──► result .append ("0")

No

result .append (".")

If guess_number [1] == random_num [1] ──Yes──► result .append ("1")

No

If guess_number [1] in random_num ──Yes──► result .append ("0")

No

result .append (".")

If guess_number [2] == random_num [2] ──Yes──► result .append ("1")

No

If guess_number [2] in random_num ──Yes──► result .append ("0")

No

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result .append (".")

If guess_number [3] == random_num [3] → Yes → result .append ("1")

No

If guess_number [3] in random_num → Yes → result .append ("0")

No

result .append (".")

Display attempts, guess_number, result

If result == ['1' , '1' , '1' ,'1'] → Yes → Display Congrats message, point

No

attempts = attempts+ 1

If attempts == 9 → No

Yes

Display You lost, random_num

Get choice
" Do You want to play another game?"

3. Python code

```python
#Import modules
import sys
import random
choice="Yes"
while (choice=="Yes"):
    #Enter user name
    name=input("Enter your name: ")
    print("\t\t\t\t Hi ",name," Welcome to GameInt")
    #Generate Random Number
    random_num= random.sample(range(1,6),4)


    #Game information
    print("\nNumber to Guess- XXXX\t\t\t Colour mapping: 1- white 2- blue 3- Red")
    print("\t\t\t\t\t\t 4- yellow 5- Green 6- Purple \n")
    print("-------------------------------------------------------------------------------------------")
    print("""GAME INSTRUCTIONS
        \n   Enter a digit at once \n   Enter 0000 to end the game \n   Enter digits in range 1 to 6 """)


    # Display menu and select Start/End for continue/Stop the game
    choice_to_play=0
    print ("\n\tGame Menu\n\t========")
    print ("\t 1 - Start")
    print ("\t 2 - Stop\n")
    while(choice_to_play not in [1,2]):
        choice_to_play=int(input("Enter your Choice : "))
        # This reads either 1 or 2 from the player
    # End of While loop choice_to_play
    if (choice_to_play==2):
        # stop the program execution
        print("Game Stopped. - Thank you!")
```

```python
        sys.exit()
    else:
        print("-------------------------------------------------------------------------------------")

        attempts=1
        points=0
        for i in range(1,9):

            #Code breaker input digits for the guess num
            guess_numbers=[]
            n=1
            while (n< 5 ):
                guess=input("Enter your guess for the digit " +str(n)+ ": ")
                if (guess=="0000"):
                    print("Thank you for playing!!!")
                    sys.exit()
                else:
                    guess_digit=int(guess)
                    if (guess_digit<1):
                        print ("Number must be greater than 0")
                    else:
                        if (guess_digit> 6):
                            print ("Number must be less than 7")
                        else:
                            guess_numbers.append(guess_digit)
                            n=n+1

            #print(guess_numbers)
            result=[]
            if(guess_numbers[0]==random_num[0]):
                result.append("1")
```

```python
        elif(guess_numbers[0]==random_num[1]  or  guess_numbers[0]==random_num[2]  or
guess_numbers[0]==random_num[3]):
            result.append("0")
        else:
            result.append(".")


        if(guess_numbers[1]==random_num[1]):
            result.append("1")
        elif(guess_numbers[1]==random_num[0]  or  guess_numbers[1]==random_num[2]  or
guess_numbers[1]==random_num[3]):
            result.append("0")
        else:
            result.append(".")


        if(guess_numbers[2]==random_num[2]):
            result.append("1")
        elif(guess_numbers[2]==random_num[0]  or  guess_numbers[2]==random_num[1]  or
guess_numbers[2]==random_num[3]):
            result.append("0")
        else:
            result.append(".")


        if(guess_numbers[3]==random_num[3]):
            result.append("1")
        elif(guess_numbers[3]==random_num[0]  or  guess_numbers[3]==random_num[1]  or
guess_numbers[3]==random_num[2]):
            result.append("0")
        else:
            result.append(".")


        #print(attempt number,code maker's guess num,result)
```

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```python
        print("\nAttempt No","\t\t\t","Guess","\t\t\t","Results")

print(str(attempts),"\t\t\t\t",guess_numbers[0],guess_numbers[1],guess_numbers[2],guess_numb
ers[3],"\t\t",result[0],result[1],result[2],result[3])

print("\n_____
_____")

        #Calculate the points for attempt
        if(result==['1','1','1','1']):
            print("\nCongratulations!!! you won the game...\n")
            points = 100 - (attempts-1) * 12.5
            print("You have scored",points,"points.")
            break
        else:
            attempts=attempts+1
        if (attempts == 9):
            print (" \nSorry you lost the game. The correct answer is ",
random_num[0],random_num[1],random_num[2],random_num[3])
    choice=str(input(" \nDo you want to play another game? (Yes/ No) :"))
```

4. Screenshots of the working program

4.1 Test Run - 1

Figure 1: Test 1

4.2 Test Run - 2

4.3 Test Run - 3

Figure 3: Test 3

5. Conclusion

This program underwent significant testing and development to reach the required solutions. Overall, though, the application developed successfully by using the Python programming language to find the needed answers. The program was entirely coded using the IDLE (python 3.11 64 bit) software and was executed using python shell. In conclusion, the fundamental Python commands were utilized to develop this software, which was a huge success.