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INSTITUTE OF  
TECHNOLOGY

## Foundation Certificate in Higher Education

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## Abstract

This project introduces MathBro, an interactive Python-based math test app that aims to improve users' math abilities by providing a fun, adaptable learning environment. Users can choose from four different difficulty levels in the application ( demo, easy, medium, and hard). Depending on the mode they choose, the application will generate arithmetic questions at random. Every session is recorded, along with the user's answers, accuracy, and performance indicators like scores.

# Acknowledgement

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# 1. Introduction

This course is dedicated to the development of MathBro, a fun and interactive Python application aimed at enhancing users' math skills. The project offers dynamic quizzes at different difficulty levels in an effort to give users of all ages an enjoyable learning experience. MathBro leverages the powerful features of Python to ensure adaptability, ease of use, and efficient performance monitoring.

Math can be much less intimidating or overwhelming and more accessible as the need for educational resources that blend enjoyment and usefulness is continuously growing. In the settings, users have the ability to select different difficulty levels: Demo, Easy, Medium, and Hard. Each level was fitted to a different skill and difficulty levels. MathBro allows one practice by enabling features such as preserving the session data, performance analysis, and random question generation for continuous improvements in practice over time.

This project combines some of the most important concepts in programming, including control structures, file handling, and modular design, using Python in a way that solves real-world challenges. Also, the application displays the results of sessions both in text and HTML formats, showing proficiency in handling multiple output formats for user convenience.

In this project, aim to be able to highlight how programming could provide new, effective and also put into practice theoretic material that I learned during the course for a practical and realistic solution.



## 2. Algorithm

1. Start

2. Initialize the variables

3. Mode Selection

If no argument is given, set mode to demo.

If the argument is **-e** , switch to **Easy mode**.

If the argument is **-m** , switch to **Medium mode**.

If the argument is **-h** , switch to **Hard mode**.

If the argument is not valid , terminate the program with an error message

4. Set up question

**Demo Mode:**

Number of questions: 3

Number range: 1 to 5

Operators: “+”

**Easy Mode:**

Number of questions: 5

Number range: 1 to 10

Operators: “+”, “-”

**Medium Mode:**

Number of questions: 10

Number range: 1 to 10

Operators: “+”, “-”

**Hard Mode:**

Number of questions: 10

Number range: 1 to 20

Operators: “+”, “-”, “\*”

## 5. Question Generation

Randomly pick two numbers and an operator.  
Display questions and get user input.  
Validate input and evaluate the answer.  
Track correct/wrong answers and update session.  
Display session results.  
Ask if the user wants another session. Repeat or exit

## 6. Saving Session Data

Save session results in a **text file**  
Save session results in an **HTML file**

## 7. Main Function

Call mode\_selector ( ) to get the mode.  
Call sys\_configurations ( ) to configure the system.  
To start the session and manage user input, question creation, and session tracking,  
call question\_generator ( ).

## 8. End.

### 3. Python Code

```
import sys
import random
import datetime
import webbrowser
import os

#Initialize global variable

global session_id
session_id = 0

def mode_selector():
    mode = ""

    if len(sys.argv) < 2:
        mode = "demo"
    else:
        #Map the arguments to respective modes
        if sys.argv[1] == "-e":
            mode = "easy"
        elif sys.argv[1] == "-m":
            mode = "medium"
        elif sys.argv[1] == "-h":
            mode = "hard"
        else:
            print("Invalid mode selected.")
```

```
        sys.exit()

    return mode

def sys_configurations(mode):

    arithmetics = ["+"]
    start_range = 0
    end_range = 0
    number_of_questions = 0

    match mode:
        case "demo":
            start_range = 0
            end_range = 5
            number_of_questions = 3
        case "easy":
            start_range = 0
            end_range = 10
            number_of_questions = 5
            arithmetics.append("-")
        case "medium":
            start_range = 0
            end_range = 10
            number_of_questions = 10
            arithmetics.append("-")
        case "hard":
            start_range = 0
            end_range = 20
```

```

        number_of_questions = 10

        arithmetics.append("-")

        arithmetics.append("*")

    return arithmetics, start_range, end_range, number_of_questions, mode

def question_generator(arithmetics, start_range, end_range, number_of_questions, mode):

    all_sessions = []

    global session_id

    while True:

        session_id = session_id + 1

        session = {"sessionId": session_id, "sessionData": [], "mode": mode, "Correct": 0, "Wrong": 0}

        correct = 0

        wrong = 0

        print(f"\n\nSession {session_id} Mathbro.\n\n")

        for i in range(number_of_questions):

            num1 = random.randint(start_range, end_range)

            num2 = random.randint(start_range, end_range)

            operator = random.choice(arithmetics)

            question = f" | {i+1}) {num1}{operator}{num2} = ? "

            answer = answer_generator(num1, num2, operator)

```

```

while True:

    try:

        user_answer = int(input(question))

        break

    except ValueError:

        print("Invalid input! Please enter a numeric value.")


if user_answer == (answer):

    result = "(√) You're answer is Correct! \n"

    mark = "√"

    txt_result = f"{mark}{question}={user_answer}"

    correct = correct + 1


else:

    result = f"(X) You're answer is Wrong! correct answer is {str(answer)} \n"

    mark = "X"

    txt_result = f"{mark}{question} = {user_answer} Correct answer is {answer}"

    wrong = wrong + 1


print(result)

session["sessionData"].append([txt_result])

#Update session status
session["mode"] = mode
session["Correct"] = correct
session["Wrong"] = wrong


all_sessions.append(session)

print(f"Session {session_id} completed. Correct: {correct}, Wrong: {wrong}")

```

```

another_session = input("Do you want to play another session? (y/n)")

if another_session != "y":
    print("Thanks for playing!")
    break

save_session_txt(all_sessions)

# Function to save session data to a text file
def save_session_txt(all_sessions):
    file_name = f"{datetime.datetime.now().strftime('%Y%m%d_%H%M')}_{random.randint(100, 999)}.txt"

    with open(file_name, "w", encoding="utf-8") as file:
        file.write("MathBro Session\n")
        file.write("-----\n\n")

        file.write("Date : " + datetime.datetime.now().strftime("%Y-%m-%d") + "\n")
        file.write("Time : " + datetime.datetime.now().strftime("%H:%M") + "\n\n")

    # Write session details
    for session in all_sessions:

        file.write(f"Session ID: {session['sessionId']}\n")
        file.write("Results Sheet\n\n")

        for data in session['sessionData']:

```

```

        file.write(data[0] + "\n")

    file.write(f"\n\nMode: {session['mode']}\n")
    file.write(f"Total Questions: {len(session['sessionData'])}\n")
    file.write(f"Correct: {session['Correct']}\n")
    file.write(f"Wrong: {session['Wrong']}\n")
    file.write(f"Score: {session['Correct']*100 / len(session['sessionData']):.2f}\n")
    file.write("\n\n")

print(f"Session saved as {file_name}")

save_html_body(all_sessions)

# Function to save session data to an HTML file
def save_html_body(all_sessions):
    file_name = f"{datetime.datetime.now().strftime('%Y%m%d_%H%M')}_{{random.randint(100, 999)}}.html"

    with open(file_name, "w", encoding="utf-8") as file:
        file.write("<html>\n")
        file.write("<head>\n")
        file.write("<title>MathBro Session</title>\n")
        file.write("</head>\n")
        file.write("<body>\n")

        file.write("<h1>MathBro Session</h1>\n")
        file.write("<hr>\n")

        file.write("<h2>Results</h2>\n")

```



```
for session in all_sessions:
```

```
    file.write(f"<h3>Session ID: {session['sessionId']}</h3>\n")
```

```
    file.write("<h4>Results Sheet</h4>\n")
```

```
    file.write("<hr>\n")
```

```
    file.write(f"<p><b>Date : {datetime.datetime.now().strftime('%Y-%m-%d')}</b></p>\n")
```

```
    file.write(f"<p><b>Time : {datetime.datetime.now().strftime('%H:%M')}</b></p>\n")
```

```
    file.write("<table border='1'>\n")
```

```
    file.write("<tr><th>Results</th></tr>\n")
```

```
    for data in session['sessionData']:
```

```
        file.write(f"<tr><td>{data[0]}</td></tr>\n")
```

```
    file.write("</table>\n")
```

```
    file.write(f"<p>Mode: {session['mode']}</p>\n")
```

```
    file.write(f"<p>Total Questions: {len(session['sessionData'])}</p>\n")
```

```
    file.write(f"<p>Correct: {session['Correct']}</p>\n")
```

```
    file.write(f"<p>Wrong: {session['Wrong']}</p>\n")
```

```
    file.write(f"<p>Score: {session['Correct']*100 / len(session['sessionData']):.2f}</p>\n")
```

```
    file.write("<hr>\n")
```

```
file.write("</body>\n")
```

```
file.write("</html>\n")
```

```
file.close()
```

```
# Ask if the user wants to open the file in a browser

openHtmlDoc = input("Do you want to open the session in browser? (y/n)")

if openHtmlDoc == "y":

    webbrowser.open(f"file://{os.path.realpath(file_name)}")


print(f"Session saved as {file_name}")


# Function to calculate the answer for a question

def answer_generator(num1, num2, operator):

    return eval(f"{num1}{operator}{num2}")


# Main function to start the program

def main():

    mode = mode_selector()

    arithmetics, start_range, end_range, number_of_questions, mode = sys_configurations(mode)

    question_generator(arithmetics, start_range, end_range, number_of_questions, mode)


# Entry point of the program

if __name__ == "__main__":

    main()
```

## 4. Explain Packages

### 4.1 Import os

- The OS module in Python provides functions for interacting with the operating system.
- **Usage in the Program:**

Resolves the absolute path of the generated HTML file so it can be opened in the browser

### 4.2 Import webbrowser

- In Python, **webbrowser module** is a convenient web browser controller. It provides a high-level interface that allows displaying Web-based documents to users
- **Usage in the Program:**

Opens the generated HTML file in the user's default browser for viewing session results.

### 4.3 Import datetime

- The datetime module supplies classes for manipulating dates and times. It provides a combination of the date and time modules for more complex operations involving both dates and times.
- **Usage in the Program:**

Formats the current date and time for file naming and session details.

## 4.4 Import sys

- The sys module used to handle command-line arguments and system-specific functions.

- **Usage in the Program:**

sys.argv is used to read command-line arguments for selecting the difficulty mode (demo, -e, -m, -h).

## 4.5 Import random

- This module can be used to perform random actions such as generating random numbers, printing random a value for a list or string, etc.

- **Usage in the program:**

random.randint(start\_range, end\_range): Generates random numbers for math problems.

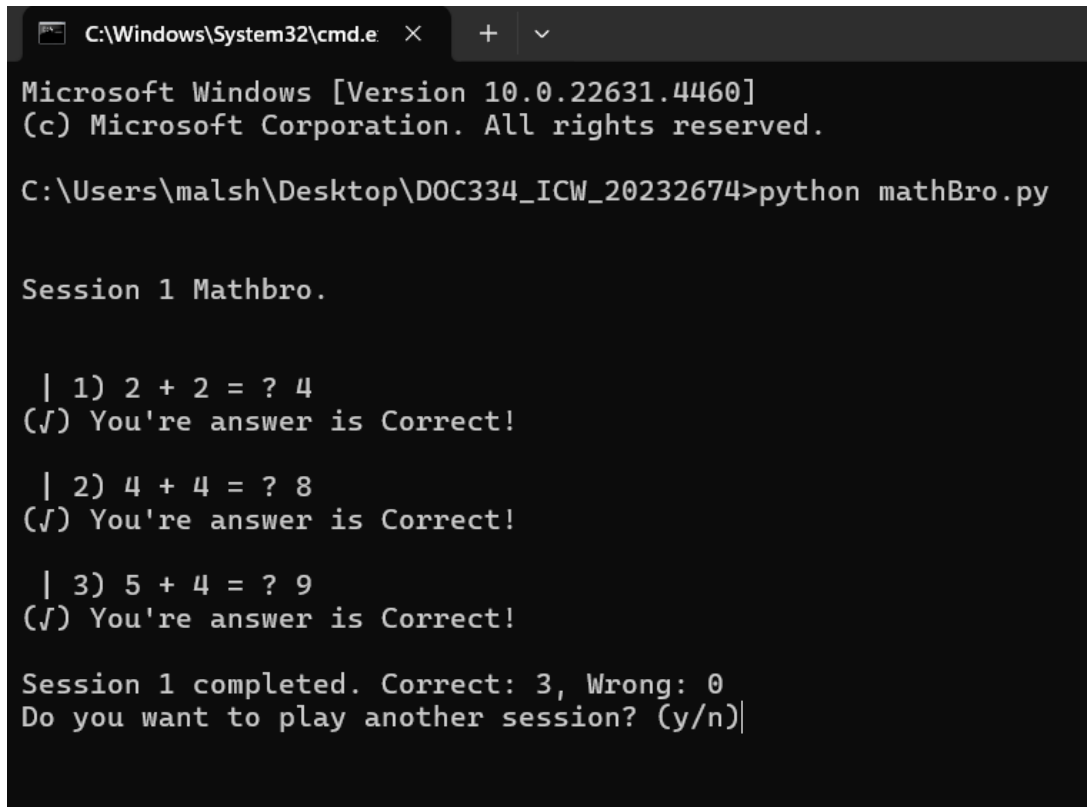
random.choice(arithmetics): Selects a random operator (+, -, \*) from a list.

random.randint(100, 999): Generates a random number to create unique filenames for session data.

## 5. Running Program

### 5.1 Demo mode

#### 5.1.1 Input Correct answers only



```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py

Session 1 Mathbro.

| 1) 2 + 2 = ? 4
(✓) You're answer is Correct!

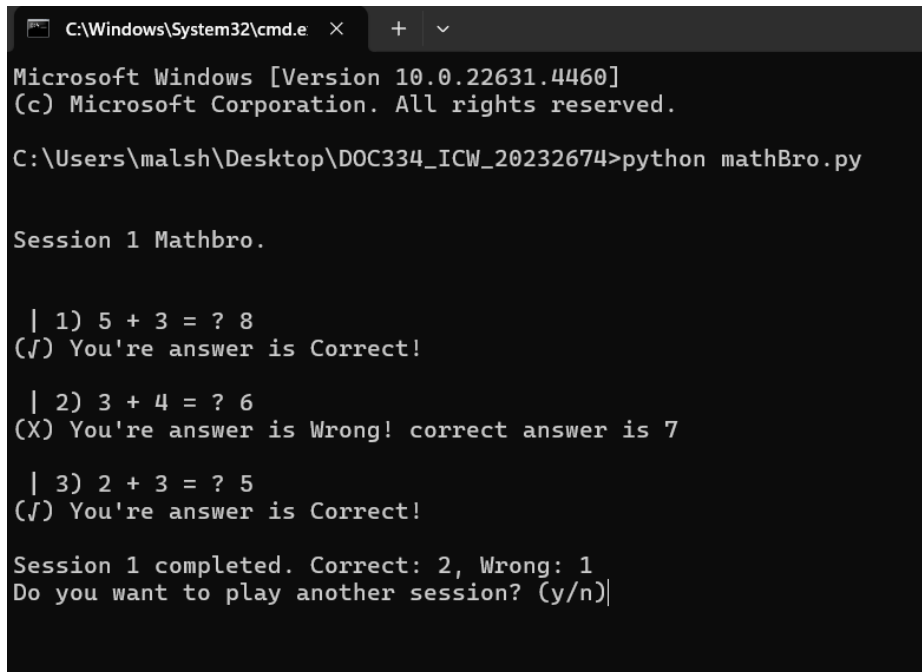
| 2) 4 + 4 = ? 8
(✓) You're answer is Correct!

| 3) 5 + 4 = ? 9
(✓) You're answer is Correct!

Session 1 completed. Correct: 3, Wrong: 0
Do you want to play another session? (y/n)|
```

Figure 1. Correct input - Demo

### 5.1.2 Input Correct answers , Wrong answers



```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py

Session 1 Mathbro.

| 1) 5 + 3 = ? 8
(✓) You're answer is Correct!

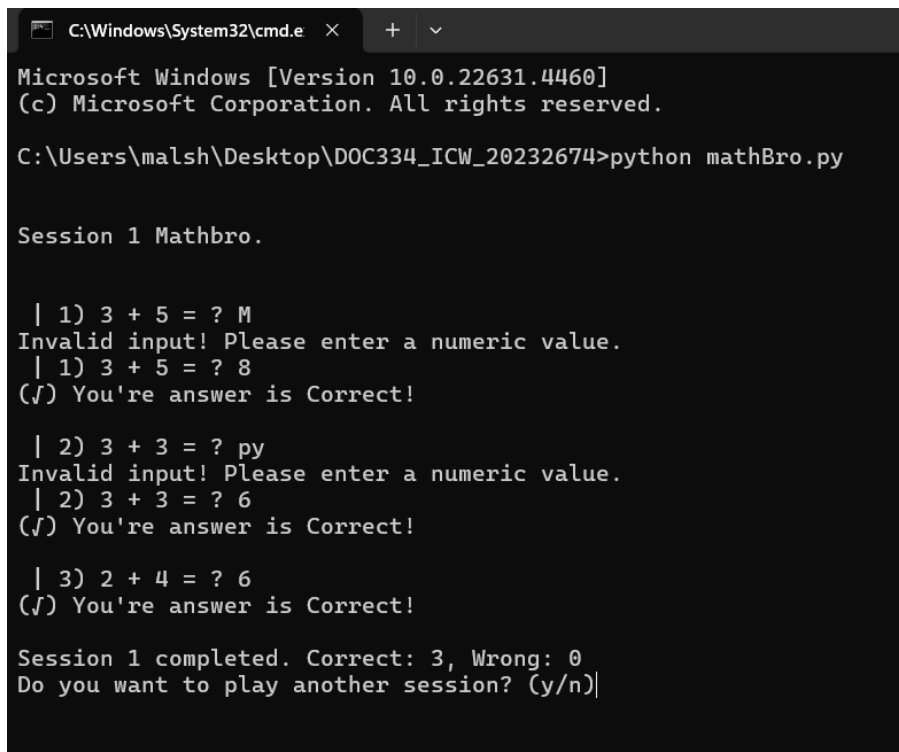
| 2) 3 + 4 = ? 6
(X) You're answer is Wrong! correct answer is 7

| 3) 2 + 3 = ? 5
(✓) You're answer is Correct!

Session 1 completed. Correct: 2, Wrong: 1
Do you want to play another session? (y/n)|
```

Figure 2.correct and wrong input -Demo

### 5.1.3 Input String



```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py

Session 1 Mathbro.

| 1) 3 + 5 = ? M
Invalid input! Please enter a numeric value.
| 1) 3 + 5 = ? 8
(✓) You're answer is Correct!


| 2) 3 + 3 = ? py
Invalid input! Please enter a numeric value.
| 2) 3 + 3 = ? 6
(✓) You're answer is Correct!

| 3) 2 + 4 = ? 6
(✓) You're answer is Correct!

Session 1 completed. Correct: 3, Wrong: 0
Do you want to play another session? (y/n)|
```

Figure 3.Input string - Demo

#### 5.1.4 Play another session



```
C:\Windows\System32\cmd.e  X  +  v

Session 1 Mathbro.

| 1) 1 + 1 = ? 2
(✓) You're answer is Correct!

| 2) 4 + 1 = ? 5
(✓) You're answer is Correct!

| 3) 4 + 4 = ? 8
(✓) You're answer is Correct!

Session 1 completed. Correct: 3, Wrong: 0
Do you want to play another session? (y/n)y

Session 2 Mathbro.

| 1) 3 + 1 = ? 4
(✓) You're answer is Correct!

| 2) 2 + 4 = ? 6
(✓) You're answer is Correct!

| 3) 4 + 4 = ? 8
(✓) You're answer is Correct!

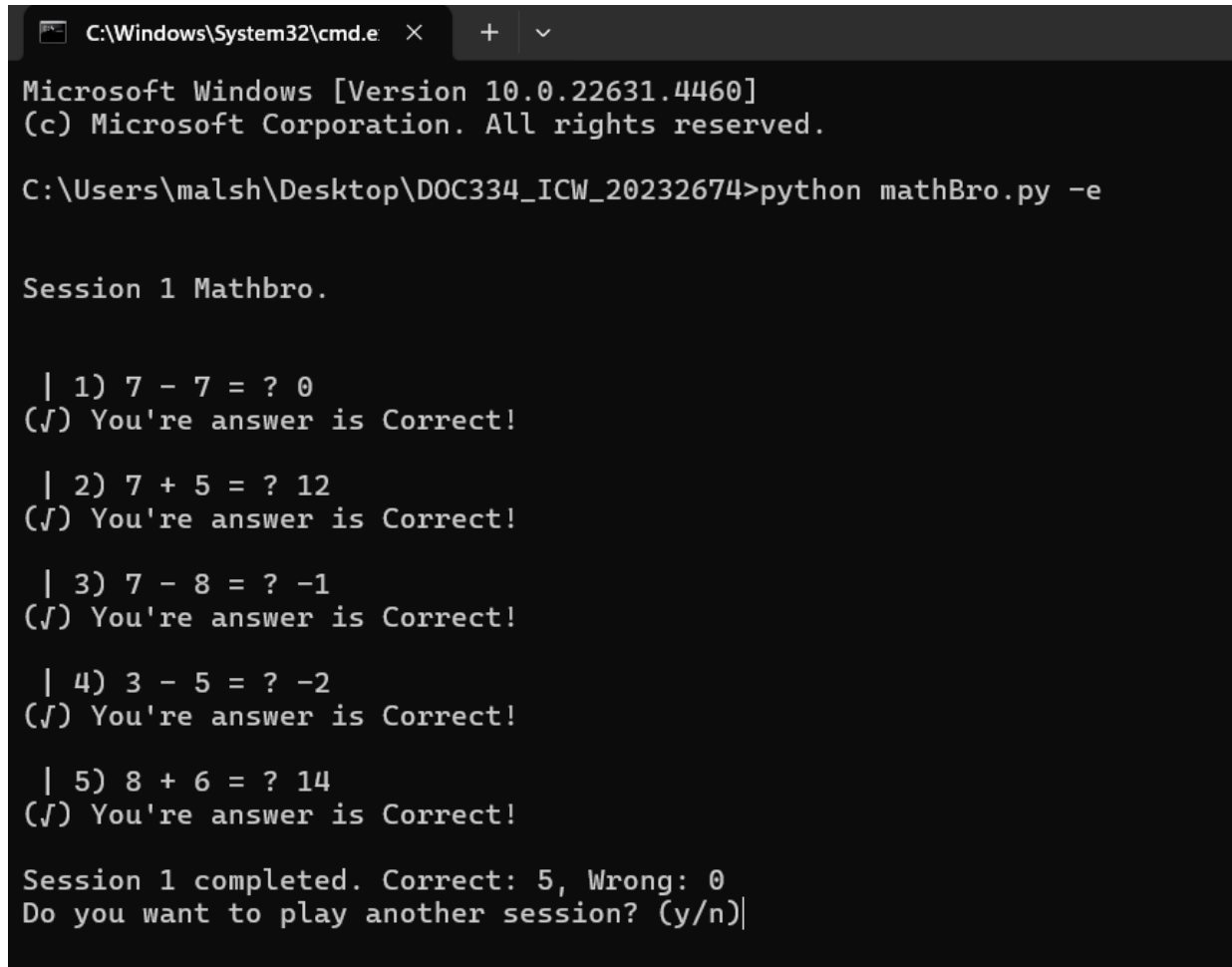
Session 2 completed. Correct: 3, Wrong: 0
Do you want to play another session? (y/n)n
Thanks for playing!
Session saved as 20241129_1334_214.txt
Do you want to open the session in browser? (y/n)n
Session saved as 20241129_1334_605.html

C:\Users\malsh\Desktop\DOC334_ICW_20232674>
```

Figure 4. Play another session - Demo

## 5.2 Easy Mode

### 5.2.1 Input Correct answers only



```
C:\Windows\System32\cmd.e  ×  +  ∨  
Microsoft Windows [Version 10.0.22631.4460]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -e  
  
Session 1 Mathbro.  
  
| 1) 7 - 7 = ? 0  
(/) You're answer is Correct!  
  
| 2) 7 + 5 = ? 12  
(/) You're answer is Correct!  
  
| 3) 7 - 8 = ? -1  
(/) You're answer is Correct!  
  
| 4) 3 - 5 = ? -2  
(/) You're answer is Correct!  
  
| 5) 8 + 6 = ? 14  
(/) You're answer is Correct!  
  
Session 1 completed. Correct: 5, Wrong: 0  
Do you want to play another session? (y/n)|
```

Figure 5. Correct input -Easy



### 5.2.2 Input Correct answers , Wrong answers

```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -e

Session 1 Mathbro.

| 1) 3 + 5 = ? 8
(✓) You're answer is Correct!

| 2) 5 + 6 = ? 2
(X) You're answer is Wrong! correct answer is 11

| 3) 1 - 7 = ? -6
(✓) You're answer is Correct!

| 4) 4 + 9 = ? 12
(X) You're answer is Wrong! correct answer is 13

| 5) 3 - 8 = ? -5
(✓) You're answer is Correct!

Session 1 completed. Correct: 3, Wrong: 2
Do you want to play another session? (y/n)|
```

Figure 6. Correct input & wrong input - Easy

### 5.2.3 Input string

```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -e

Session 1 Mathbro.

| 1) 7 - 6 = ? 1
(✓) You're answer is Correct!

| 2) 2 + 6 = ? 8
(✓) You're answer is Correct!

| 3) 1 - 6 = ? py
Invalid input! Please enter a numeric value.
| 3) 1 - 6 = ? -5
(✓) You're answer is Correct!

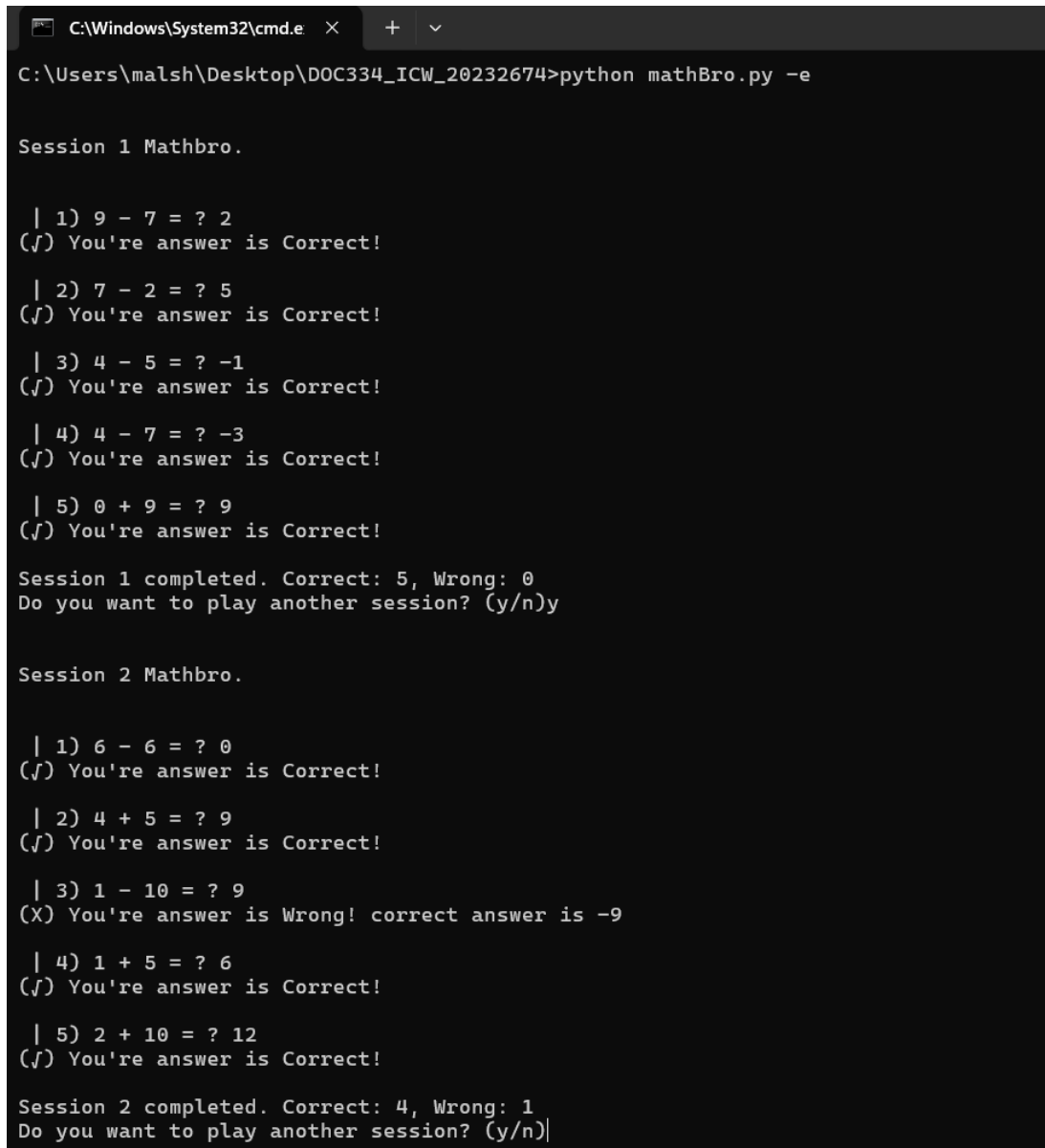
| 4) 9 + 8 = ? py
Invalid input! Please enter a numeric value.
| 4) 9 + 8 = ? 17
(✓) You're answer is Correct!

| 5) 6 - 1 = ? 5
(✓) You're answer is Correct!

Session 1 completed. Correct: 5, Wrong: 0
Do you want to play another session? (y/n)|
```

Figure 7. Input String - Easy

## 5.2.4 Play another session



```
C:\Windows\System32\cmd.e  X  +  v
C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -e

Session 1 Mathbro.

| 1) 9 - 7 = ? 2
(✓) You're answer is Correct!

| 2) 7 - 2 = ? 5
(✓) You're answer is Correct!

| 3) 4 - 5 = ? -1
(✓) You're answer is Correct!

| 4) 4 - 7 = ? -3
(✓) You're answer is Correct!

| 5) 0 + 9 = ? 9
(✓) You're answer is Correct!

Session 1 completed. Correct: 5, Wrong: 0
Do you want to play another session? (y/n)y

Session 2 Mathbro.

| 1) 6 - 6 = ? 0
(✓) You're answer is Correct!

| 2) 4 + 5 = ? 9
(✓) You're answer is Correct!

| 3) 1 - 10 = ? 9
(X) You're answer is Wrong! correct answer is -9

| 4) 1 + 5 = ? 6
(✓) You're answer is Correct!

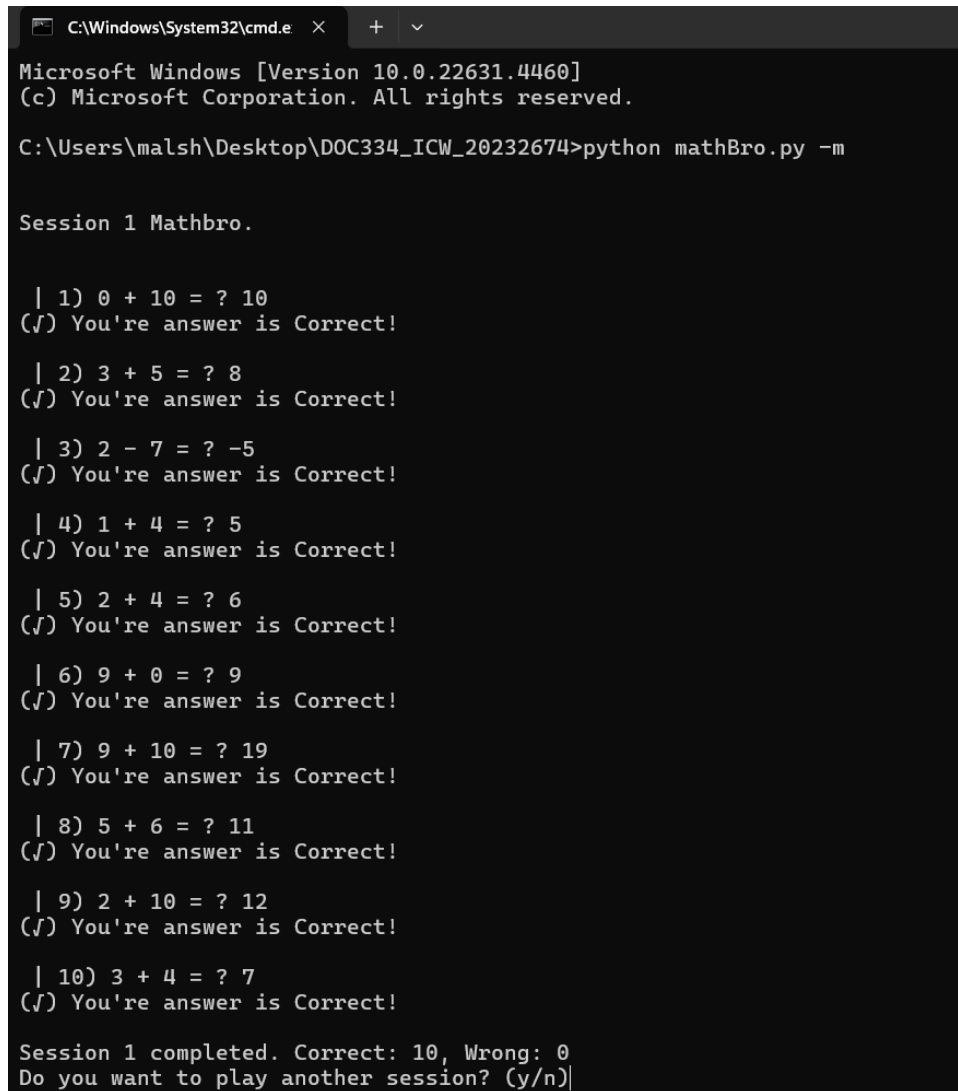
| 5) 2 + 10 = ? 12
(✓) You're answer is Correct!

Session 2 completed. Correct: 4, Wrong: 1
Do you want to play another session? (y/n)|
```

Figure 8.play another session -Easy

## 5.3 Medium Mode

### 5.3.1 Input Correct answers only



```
C:\Windows\System32\cmd.e  X  +  v

Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -m

Session 1 Mathbro.

| 1) 0 + 10 = ? 10
(✓) You're answer is Correct!

| 2) 3 + 5 = ? 8
(✓) You're answer is Correct!

| 3) 2 - 7 = ? -5
(✓) You're answer is Correct!

| 4) 1 + 4 = ? 5
(✓) You're answer is Correct!

| 5) 2 + 4 = ? 6
(✓) You're answer is Correct!

| 6) 9 + 0 = ? 9
(✓) You're answer is Correct!

| 7) 9 + 10 = ? 19
(✓) You're answer is Correct!

| 8) 5 + 6 = ? 11
(✓) You're answer is Correct!

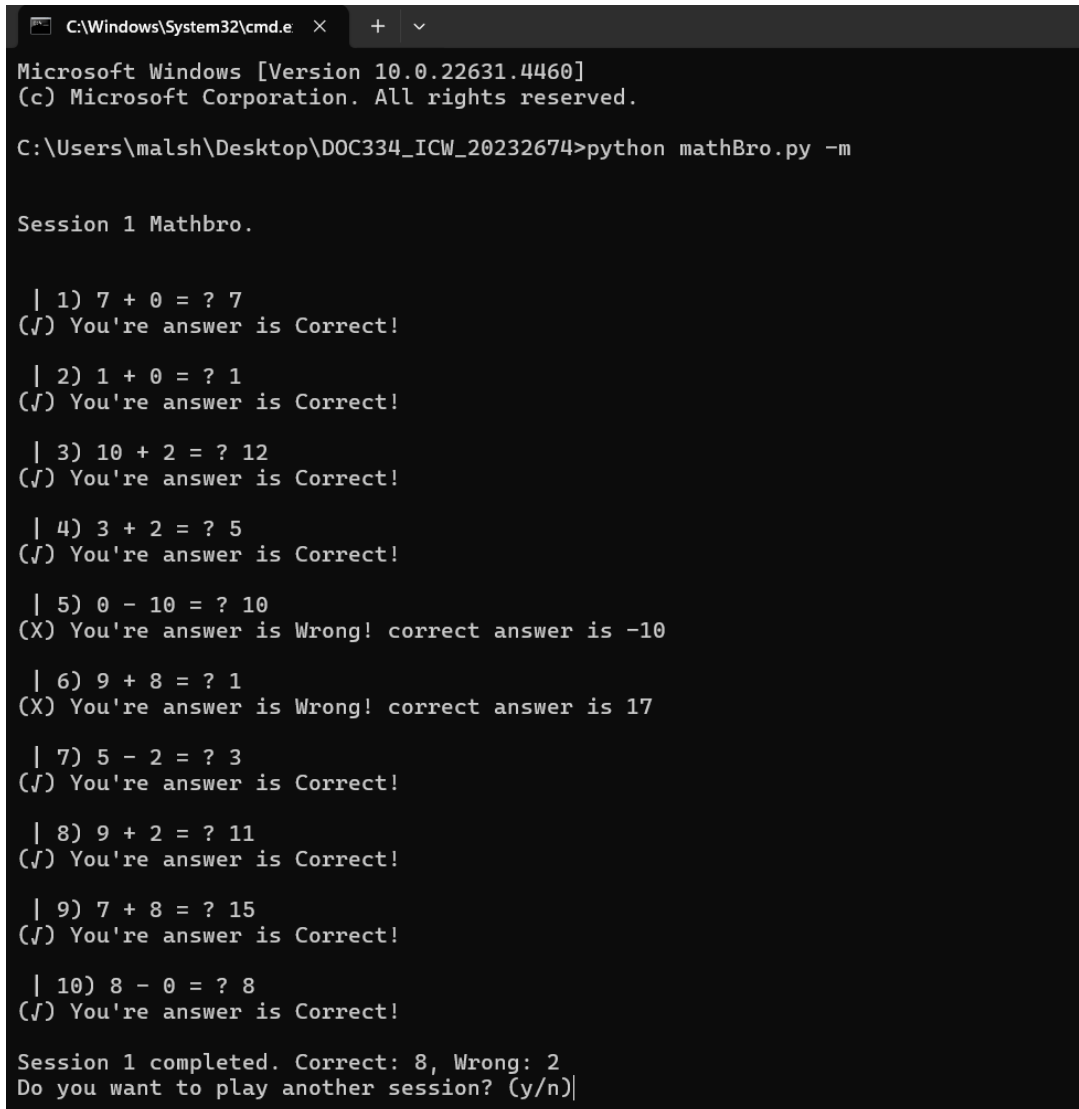
| 9) 2 + 10 = ? 12
(✓) You're answer is Correct!

| 10) 3 + 4 = ? 7
(✓) You're answer is Correct!

Session 1 completed. Correct: 10, Wrong: 0
Do you want to play another session? (y/n)|
```

Figure 9. Correct input -Medium

### 5.3.2 Input Correct answers , Wrong answers



```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -m

Session 1 Mathbro.

| 1) 7 + 0 = ? 7
(✓) You're answer is Correct!

| 2) 1 + 0 = ? 1
(✓) You're answer is Correct!

| 3) 10 + 2 = ? 12
(✓) You're answer is Correct!

| 4) 3 + 2 = ? 5
(✓) You're answer is Correct!

| 5) 0 - 10 = ? 10
(X) You're answer is Wrong! correct answer is -10

| 6) 9 + 8 = ? 1
(X) You're answer is Wrong! correct answer is 17

| 7) 5 - 2 = ? 3
(✓) You're answer is Correct!

| 8) 9 + 2 = ? 11
(✓) You're answer is Correct!

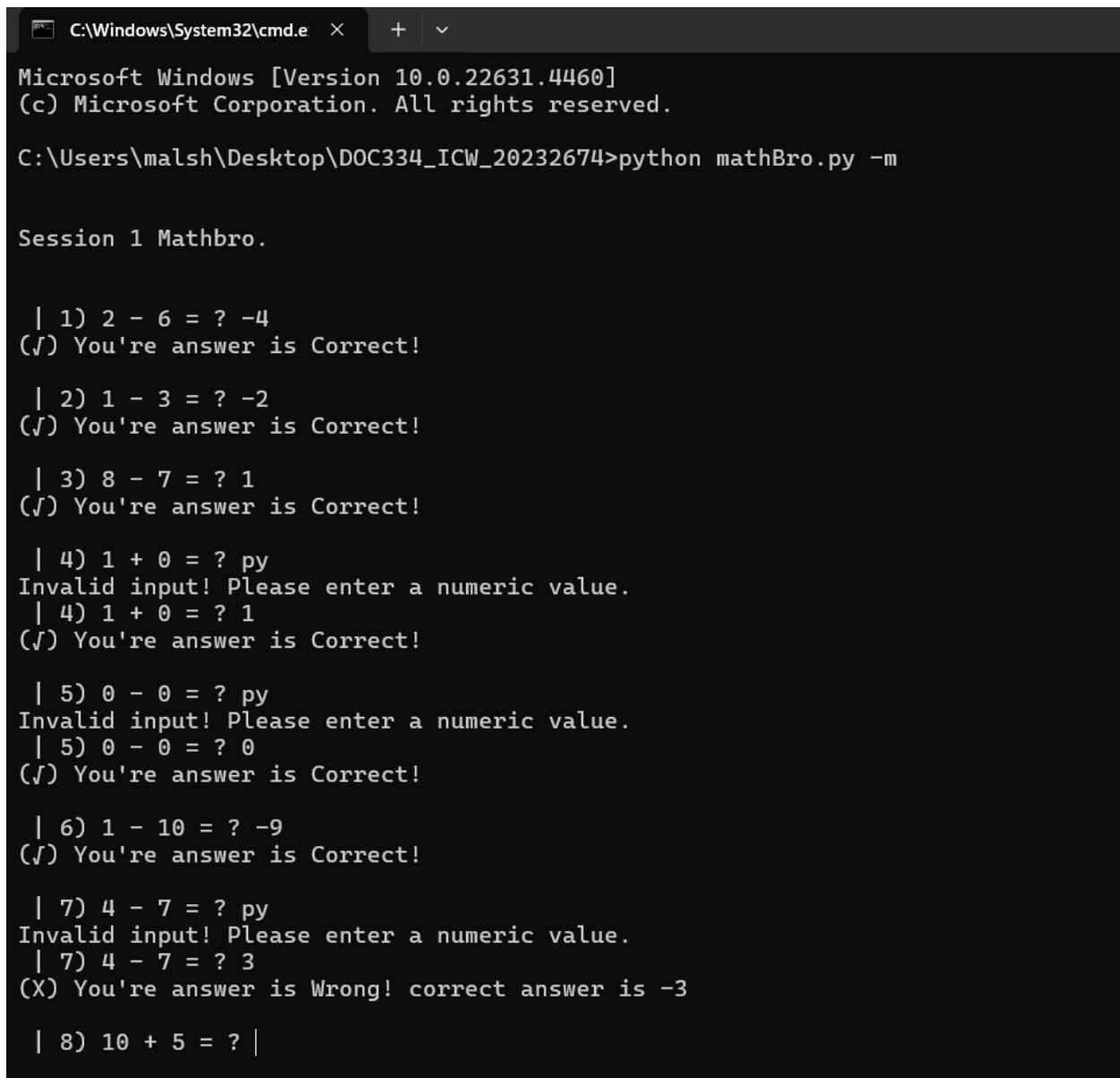
| 9) 7 + 8 = ? 15
(✓) You're answer is Correct!

| 10) 8 - 0 = ? 8
(✓) You're answer is Correct!

Session 1 completed. Correct: 8, Wrong: 2
Do you want to play another session? (y/n)
```

Figure 10. Correct input & wrong input - medium

### 5.3.3 Input String



```
C:\Windows\System32\cmd.e  X  +  v

Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -m

Session 1 Mathbro.

| 1) 2 - 6 = ? -4
(J) You're answer is Correct!

| 2) 1 - 3 = ? -2
(J) You're answer is Correct!

| 3) 8 - 7 = ? 1
(J) You're answer is Correct!

| 4) 1 + 0 = ? py
Invalid input! Please enter a numeric value.
| 4) 1 + 0 = ? 1
(J) You're answer is Correct!

| 5) 0 - 0 = ? py
Invalid input! Please enter a numeric value.
| 5) 0 - 0 = ? 0
(J) You're answer is Correct!

| 6) 1 - 10 = ? -9
(J) You're answer is Correct!

| 7) 4 - 7 = ? py
Invalid input! Please enter a numeric value.
| 7) 4 - 7 = ? 3
(X) You're answer is Wrong! correct answer is -3

| 8) 10 + 5 = ? |
```

Figure 11.Input string - medium

### 5.3.4 Play another session

```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -m

Session 1 Mathbro.

| 1) 10 + 9 = ? 19
(✓) You're answer is Correct!

| 2) 8 - 5 = ? 3
(✓) You're answer is Correct!

| 3) 8 + 2 = ? 10
(✓) You're answer is Correct!

| 4) 10 + 8 = ? 18
(✓) You're answer is Correct!

| 5) 6 - 5 = ? 1
(✓) You're answer is Correct!

| 6) 4 - 7 = ? -3
(✓) You're answer is Correct!

| 7) 4 + 0 = ? 4
(✓) You're answer is Correct!

| 8) 0 - 6 = ? -6
(✓) You're answer is Correct!

| 9) 10 + 3 = ? 13
(✓) You're answer is Correct!

| 10) 3 - 7 = ? -4
(✓) You're answer is Correct!

Session 1 completed. Correct: 10, Wrong: 0
Do you want to play another session? (y/n)y
```

Figure 12.play another session1 - medium

```
C:\Windows\System32\cmd.e  X  +  v
Session 1 completed. Correct: 10, Wrong: 0
Do you want to play another session? (y/n)y

Session 2 Mathbro.

| 1) 3 + 6 = ? 6
(X) You're answer is Wrong! correct answer is 9

| 2) 1 + 9 = ? 10
(✓) You're answer is Correct!

| 3) 9 + 9 = ? 18
(✓) You're answer is Correct!

| 4) 3 + 2 = ? 5
(✓) You're answer is Correct!

| 5) 1 - 3 = ? -2
(✓) You're answer is Correct!

| 6) 4 + 8 = ? 12
(✓) You're answer is Correct!

| 7) 4 - 5 = ? -1
(✓) You're answer is Correct!

| 8) 2 + 10 = ? 12
(✓) You're answer is Correct!

| 9) 7 - 9 = ? -2
(✓) You're answer is Correct!

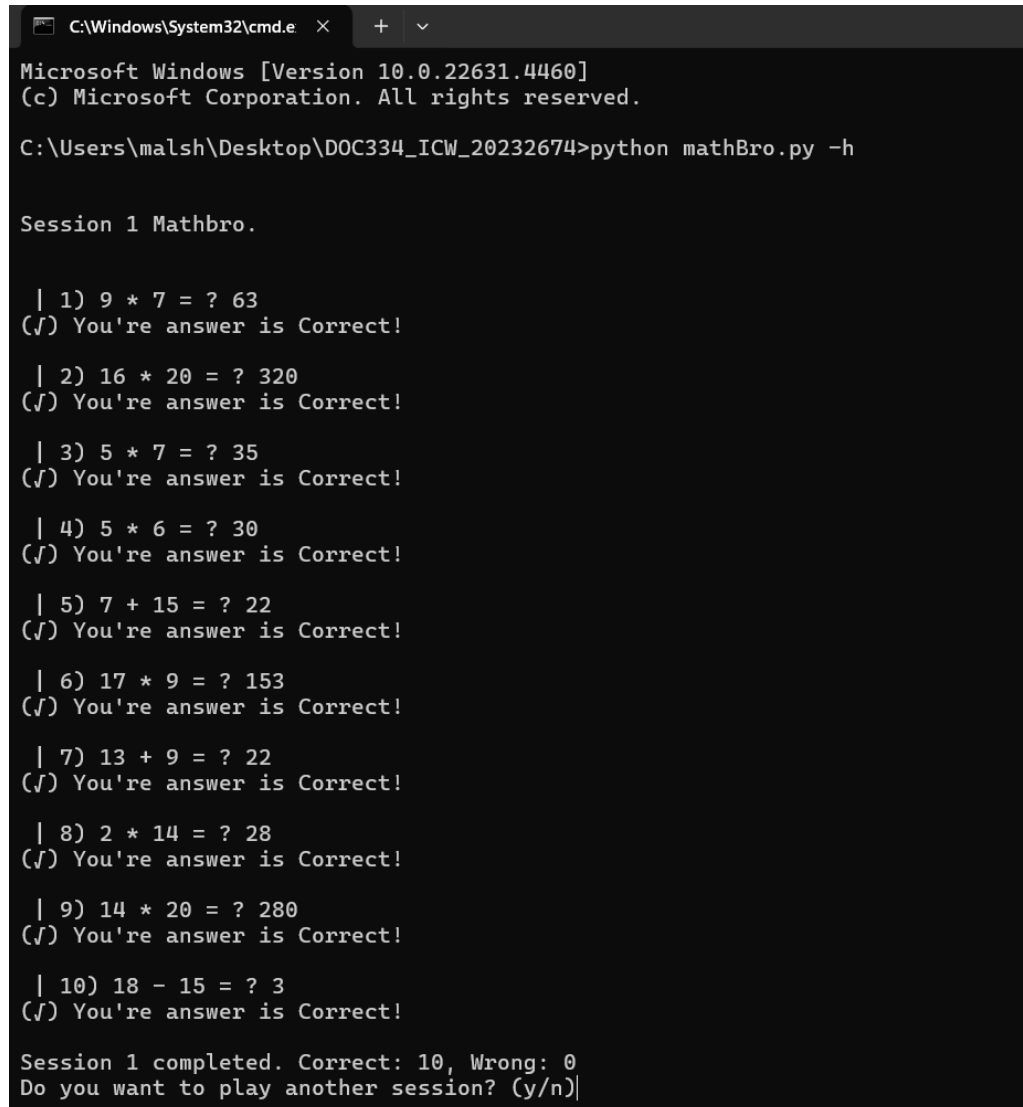
| 10) 1 - 5 = ? -4
(✓) You're answer is Correct!

Session 2 completed. Correct: 9, Wrong: 1
Do you want to play another session? (y/n)|
```

Figure 13.play another session2 - medium

## 5.4 Hard Mode

### 5.4.1 Input Correct answers only



```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -h

Session 1 Mathbro.

| 1) 9 * 7 = ? 63
(✓) You're answer is Correct!

| 2) 16 * 20 = ? 320
(✓) You're answer is Correct!

| 3) 5 * 7 = ? 35
(✓) You're answer is Correct!

| 4) 5 * 6 = ? 30
(✓) You're answer is Correct!

| 5) 7 + 15 = ? 22
(✓) You're answer is Correct!

| 6) 17 * 9 = ? 153
(✓) You're answer is Correct!

| 7) 13 + 9 = ? 22
(✓) You're answer is Correct!

| 8) 2 * 14 = ? 28
(✓) You're answer is Correct!

| 9) 14 * 20 = ? 280
(✓) You're answer is Correct!

| 10) 18 - 15 = ? 3
(✓) You're answer is Correct!

Session 1 completed. Correct: 10, Wrong: 0
Do you want to play another session? (y/n)|
```

Figure 14. Correct Input - Hard

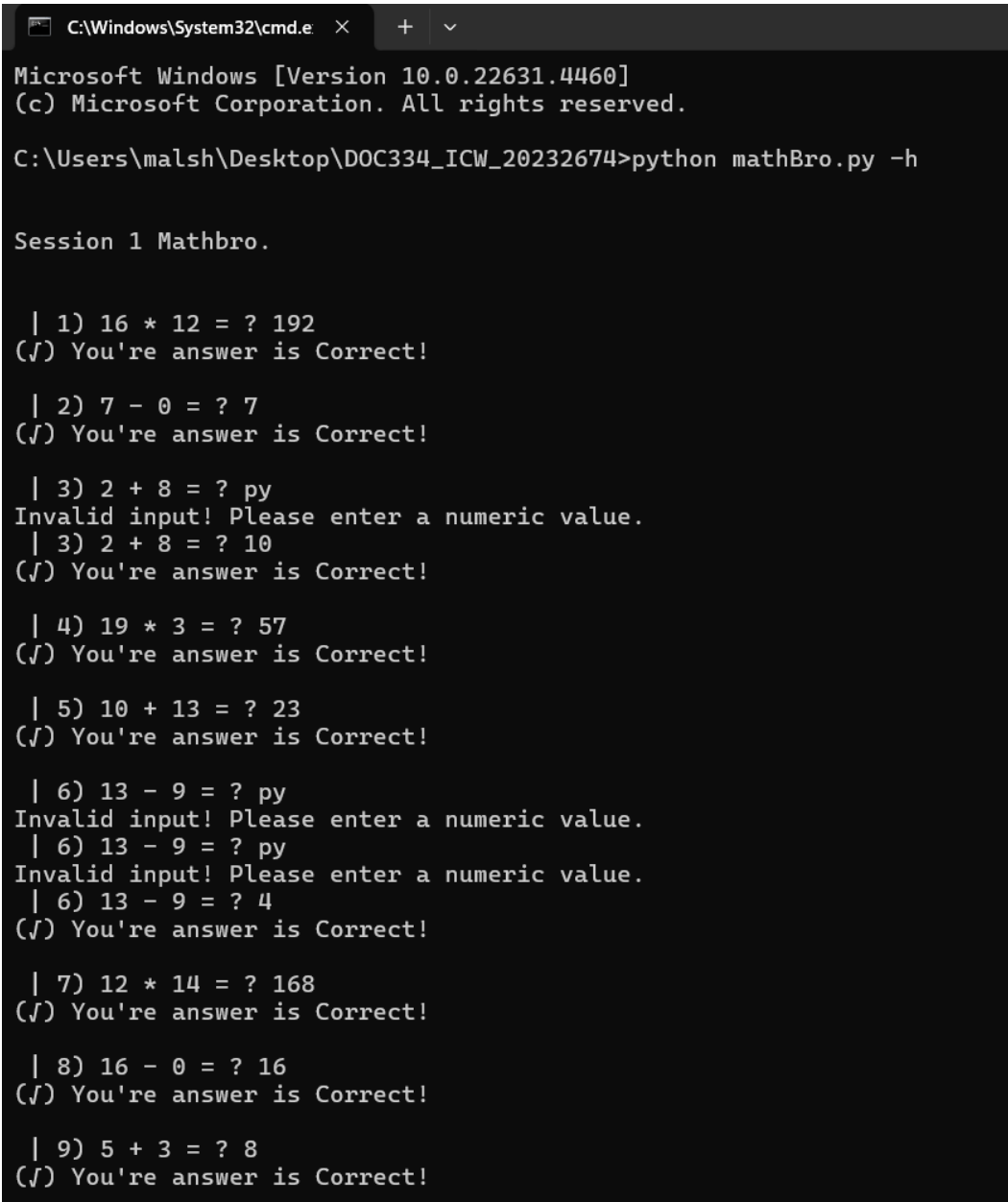
## 5.4.2 Input Correct answers , Wrong answers

```
C:\Windows\System32\cmd.e  ×  +  ∨  
Microsoft Windows [Version 10.0.22631.4460]  
(c) Microsoft Corporation. All rights reserved.  
C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -h  
  
Session 1 Mathbro.  
  
| 1) 0 - 12 = ? -12  
(✓) You're answer is Correct!  
  
| 2) 6 * 5 = ? 30  
(✓) You're answer is Correct!  
  
| 3) 17 + 4 = ? 21  
(✓) You're answer is Correct!  
  
| 4) 9 * 1 = ? 8  
(X) You're answer is Wrong! correct answer is 9  
  
| 5) 9 + 3 = ? 13  
(X) You're answer is Wrong! correct answer is 12  
  
| 6) 17 * 1 = ? 17  
(✓) You're answer is Correct!  
  
| 7) 20 * 11 = ? 12  
(X) You're answer is Wrong! correct answer is 220  
  
| 8) 12 * 2 = ? 24  
(✓) You're answer is Correct!  
  
| 9) 20 + 19 = ? 39  
(✓) You're answer is Correct!  
  
| 10) 12 * 1 = ? 12  
(✓) You're answer is Correct!  
  
Session 1 completed. Correct: 7, Wrong: 3  
Do you want to play another session? (y/n)|
```

Figure 15. Correct Input & Wrong Input - hard



### 5.4.3 Input String



```
C:\Windows\System32\cmd.e  X  +  v

Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -h

Session 1 Mathbro.

| 1) 16 * 12 = ? 192
(✓) You're answer is Correct!

| 2) 7 - 0 = ? 7
(✓) You're answer is Correct!

| 3) 2 + 8 = ? py
Invalid input! Please enter a numeric value.
| 3) 2 + 8 = ? 10
(✓) You're answer is Correct!

| 4) 19 * 3 = ? 57
(✓) You're answer is Correct!

| 5) 10 + 13 = ? 23
(✓) You're answer is Correct!

| 6) 13 - 9 = ? py
Invalid input! Please enter a numeric value.
| 6) 13 - 9 = ? py
Invalid input! Please enter a numeric value.
| 6) 13 - 9 = ? 4
(✓) You're answer is Correct!

| 7) 12 * 14 = ? 168
(✓) You're answer is Correct!

| 8) 16 - 0 = ? 16
(✓) You're answer is Correct!

| 9) 5 + 3 = ? 8
(✓) You're answer is Correct!
```

Figure 16. Input String - Hard

## 5.4.4 Play another session

```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -h

Session 1 Mathbro.

| 1) 15 - 2 = ? 13
(✓) You're answer is Correct!

| 2) 13 - 6 = ? 7
(✓) You're answer is Correct!

| 3) 7 + 18 = ? 25
(✓) You're answer is Correct!

| 4) 14 + 18 = ? 32
(✓) You're answer is Correct!

| 5) 17 - 11 = ? 6
(✓) You're answer is Correct!

| 6) 10 - 18 = ? -8
(✓) You're answer is Correct!

| 7) 9 - 0 = ? 9
(✓) You're answer is Correct!

| 8) 4 * 7 = ? 28
(✓) You're answer is Correct!

| 9) 2 - 13 = ? -11
(✓) You're answer is Correct!

| 10) 5 * 20 = ? 100
(✓) You're answer is Correct!

Session 1 completed. Correct: 10, Wrong: 0
Do you want to play another session? (y/n)y
```

Figure 18. Play another session1 - Hard

```
C:\Windows\System32\cmd.e  X  +  v
Session 2 Mathbro.

| 1) 20 - 13 = ? 7
(✓) You're answer is Correct!

| 2) 14 - 5 = ? 9
(✓) You're answer is Correct!

| 3) 4 * 13 = ? 52
(✓) You're answer is Correct!

| 4) 12 - 20 = ? -8
(✓) You're answer is Correct!

| 5) 8 * 19 = ? 152
(✓) You're answer is Correct!

| 6) 13 * 4 = ? 52
(✓) You're answer is Correct!

| 7) 11 * 7 = ? 77
(✓) You're answer is Correct!

| 8) 10 * 6 = ? 60
(✓) You're answer is Correct!

| 9) 1 - 10 = ? -9
(✓) You're answer is Correct!

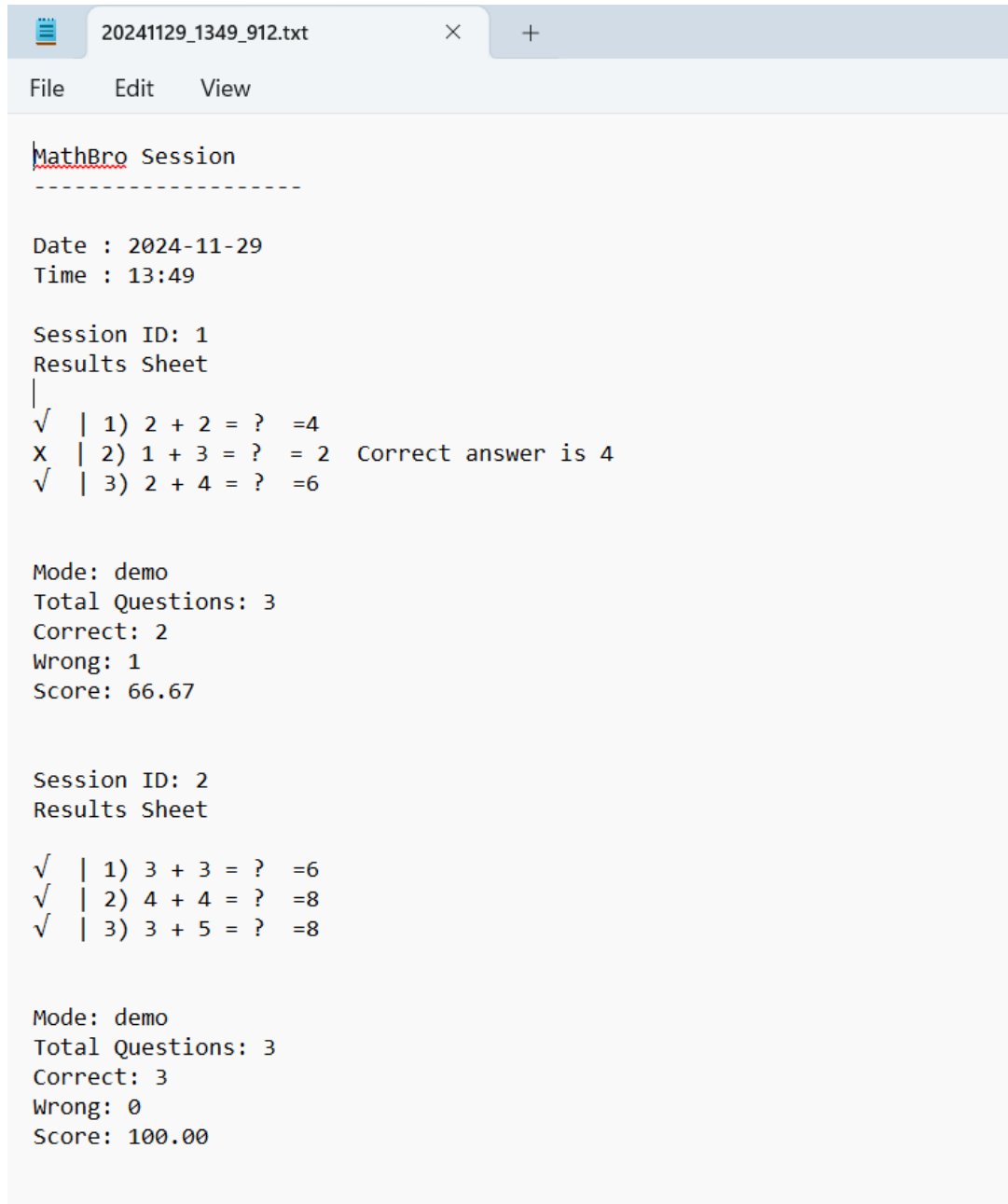
| 10) 19 - 6 = ? 13
(✓) You're answer is Correct!

Session 2 completed. Correct: 10, Wrong: 0
Do you want to play another session? (y/n)n
Thanks for playing!
Session saved as 20241129_1530_880.txt
Do you want to open the session in browser? (y/n)|
```

Figure 17. Play another session2 -Hard

## 6.Text file Screenshots

### 6.1 Demo Mode



```
20241129_1349_912.txt
File Edit View

MathBro Session
-----

Date : 2024-11-29
Time : 13:49

Session ID: 1
Results Sheet
|
√ | 1) 2 + 2 = ? =4
X | 2) 1 + 3 = ? = 2 Correct answer is 4
√ | 3) 2 + 4 = ? =6

Mode: demo
Total Questions: 3
Correct: 2
Wrong: 1
Score: 66.67

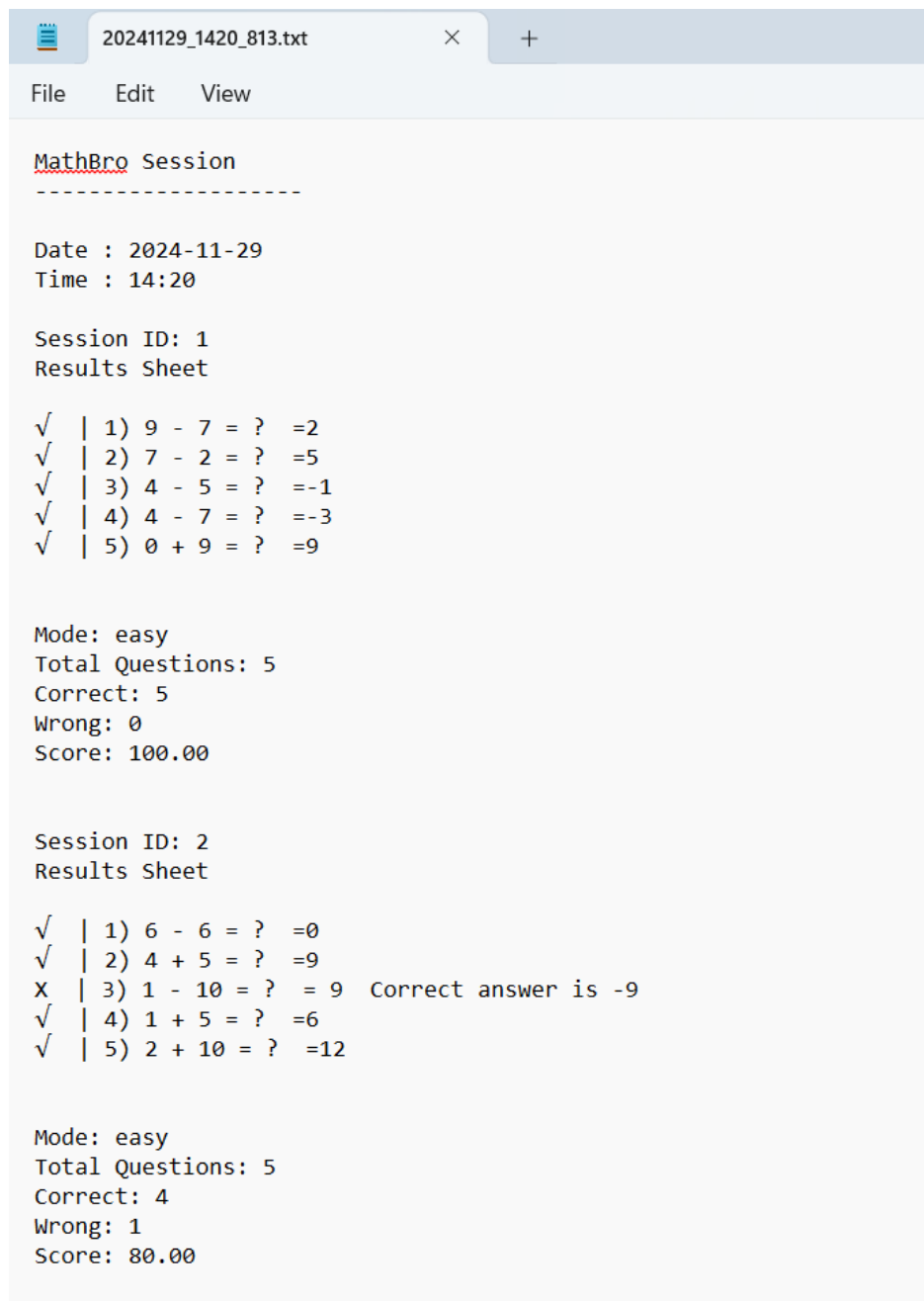
Session ID: 2
Results Sheet

√ | 1) 3 + 3 = ? =6
√ | 2) 4 + 4 = ? =8
√ | 3) 3 + 5 = ? =8

Mode: demo
Total Questions: 3
Correct: 3
Wrong: 0
Score: 100.00
```

Figure 19.Text-Demo

## 6.2 Easy Mode



The screenshot shows a text editor window with a tab titled '20241129\_1420\_813.txt'. The editor contains the following text:

```
File Edit View

MathBro Session
-----

Date : 2024-11-29
Time : 14:20

Session ID: 1
Results Sheet

√ | 1) 9 - 7 = ? =2
√ | 2) 7 - 2 = ? =5
√ | 3) 4 - 5 = ? =-1
√ | 4) 4 - 7 = ? =-3
√ | 5) 0 + 9 = ? =9

Mode: easy
Total Questions: 5
Correct: 5
Wrong: 0
Score: 100.00

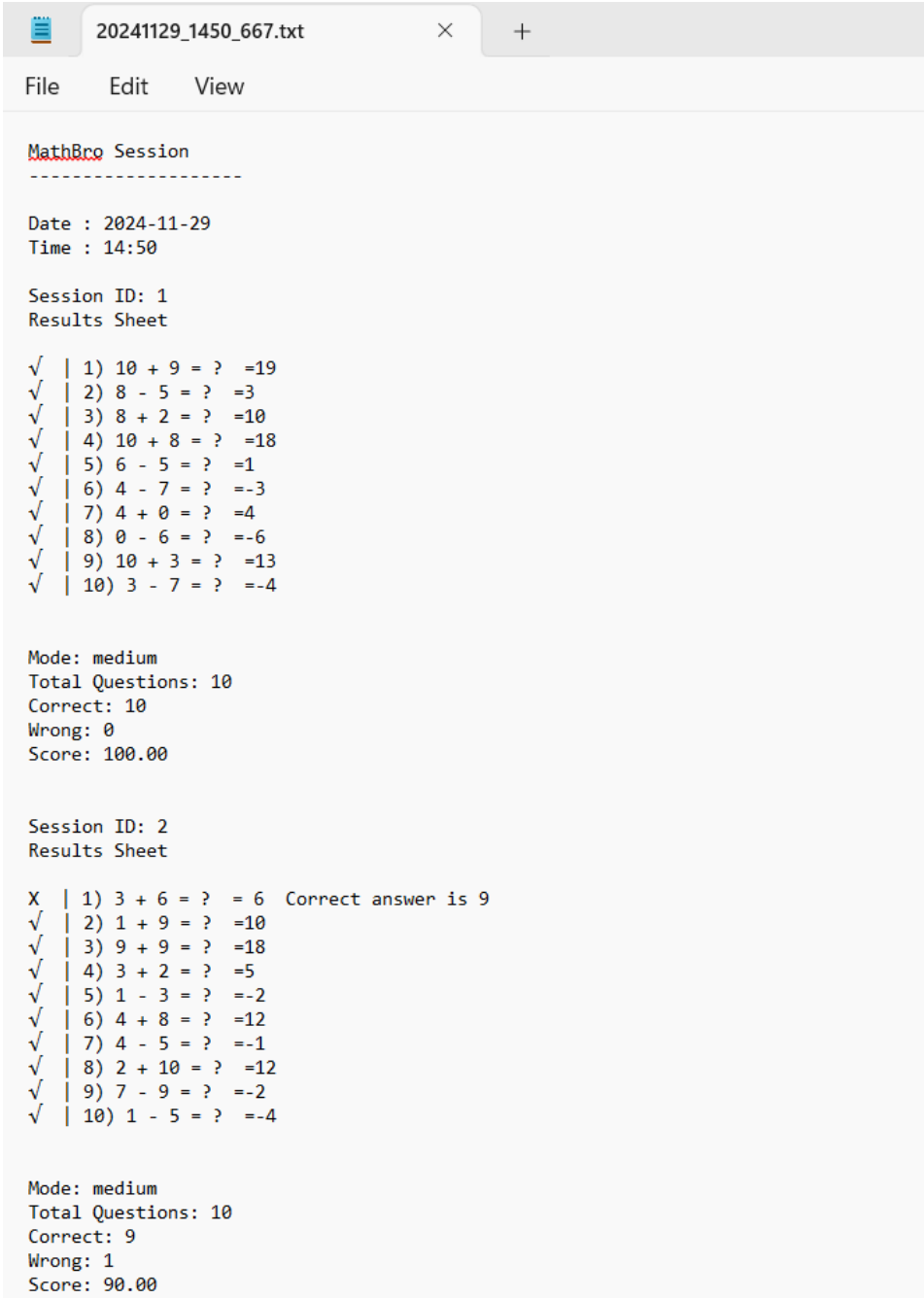
Session ID: 2
Results Sheet

√ | 1) 6 - 6 = ? =0
√ | 2) 4 + 5 = ? =9
X | 3) 1 - 10 = ? = 9 Correct answer is -9
√ | 4) 1 + 5 = ? =6
√ | 5) 2 + 10 = ? =12

Mode: easy
Total Questions: 5
Correct: 4
Wrong: 1
Score: 80.00
```

Figure 20.Text -Easy

## 6.3 Medium Mode

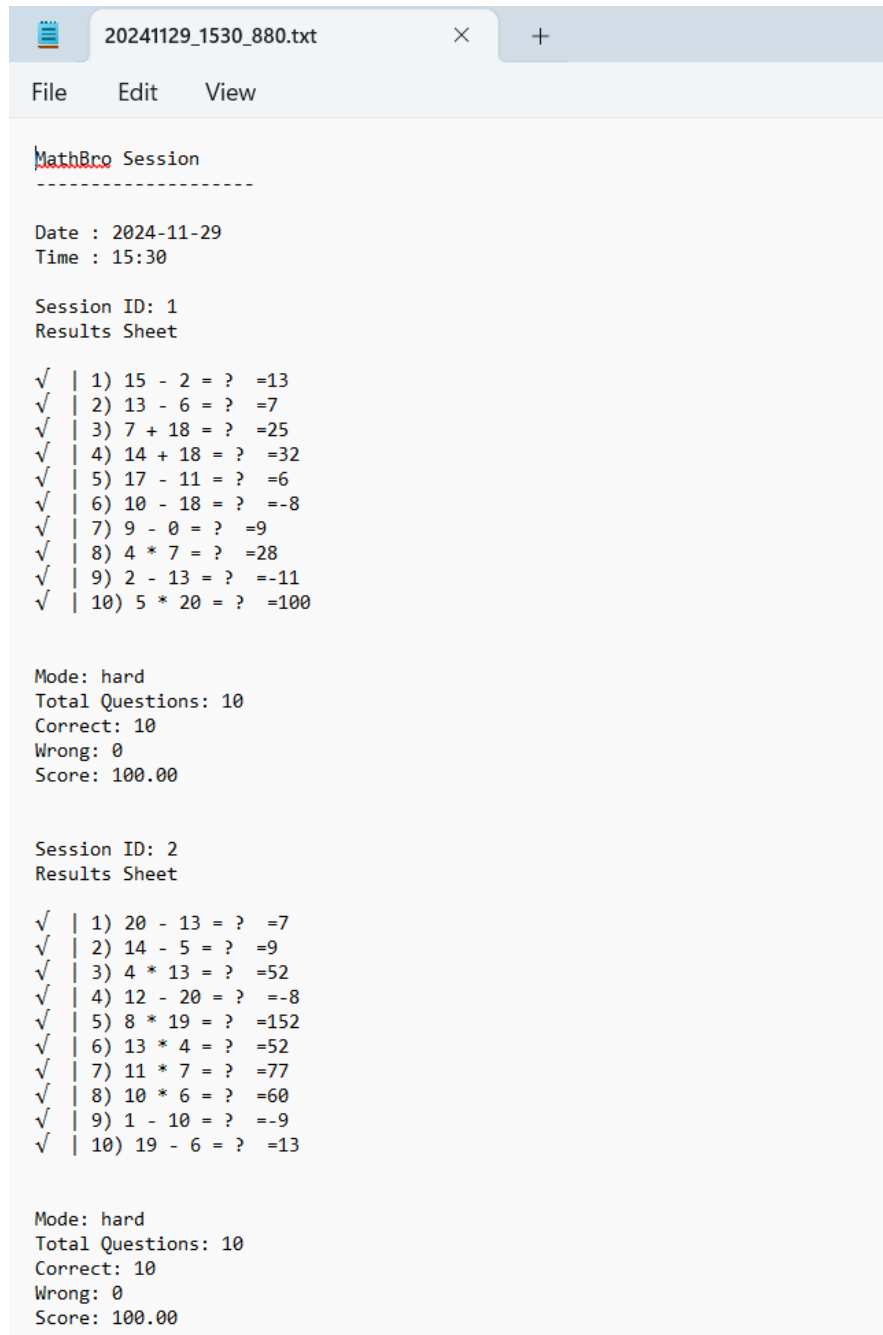


The image shows a screenshot of a web browser window with a single tab titled "20241129\_1450\_667.txt". The browser's address bar and menu bar are visible. The main content area displays the results of a MathBro session. The session is titled "MathBro Session" and is dated "2024-11-29" at "14:50". It is identified as "Session ID: 1" and is a "Results Sheet". The session was in "Mode: medium" and consisted of "Total Questions: 10". The user got "Correct: 10" and "Wrong: 0", resulting in a "Score: 100.00". Below this, "Session ID: 2" is also shown as a "Results Sheet". This session was also in "Mode: medium" with "Total Questions: 10". The user got "Correct: 9" and "Wrong: 1", resulting in a "Score: 90.00". A list of 10 math problems is provided for each session. For Session 1, all 10 problems were solved correctly. For Session 2, 9 problems were solved correctly, and 1 was solved incorrectly. The problems are as follows:

MathBro Session  
-----  
Date : 2024-11-29  
Time : 14:50  
Session ID: 1  
Results Sheet  
  
√ | 1)  $10 + 9 = ?$  =19  
√ | 2)  $8 - 5 = ?$  =3  
√ | 3)  $8 + 2 = ?$  =10  
√ | 4)  $10 + 8 = ?$  =18  
√ | 5)  $6 - 5 = ?$  =1  
√ | 6)  $4 - 7 = ?$  =-3  
√ | 7)  $4 + 0 = ?$  =4  
√ | 8)  $0 - 6 = ?$  =-6  
√ | 9)  $10 + 3 = ?$  =13  
√ | 10)  $3 - 7 = ?$  =-4  
  
Mode: medium  
Total Questions: 10  
Correct: 10  
Wrong: 0  
Score: 100.00  
  
Session ID: 2  
Results Sheet  
  
X | 1)  $3 + 6 = ?$  = 6 Correct answer is 9  
√ | 2)  $1 + 9 = ?$  =10  
√ | 3)  $9 + 9 = ?$  =18  
√ | 4)  $3 + 2 = ?$  =5  
√ | 5)  $1 - 3 = ?$  =-2  
√ | 6)  $4 + 8 = ?$  =12  
√ | 7)  $4 - 5 = ?$  =-1  
√ | 8)  $2 + 10 = ?$  =12  
√ | 9)  $7 - 9 = ?$  =-2  
√ | 10)  $1 - 5 = ?$  =-4  
  
Mode: medium  
Total Questions: 10  
Correct: 9  
Wrong: 1  
Score: 90.00

Figure 21.Text - Medium

## 6.4 Hard Mode



The screenshot shows a text editor window with a tab titled "20241129\_1530\_880.txt". The menu bar includes "File", "Edit", and "View". The text content is as follows:

```
MathBro Session
-----

Date : 2024-11-29
Time : 15:30

Session ID: 1
Results Sheet

√ | 1) 15 - 2 = ? =13
√ | 2) 13 - 6 = ? =7
√ | 3) 7 + 18 = ? =25
√ | 4) 14 + 18 = ? =32
√ | 5) 17 - 11 = ? =6
√ | 6) 10 - 18 = ? =-8
√ | 7) 9 - 0 = ? =9
√ | 8) 4 * 7 = ? =28
√ | 9) 2 - 13 = ? =-11
√ | 10) 5 * 20 = ? =100

Mode: hard
Total Questions: 10
Correct: 10
Wrong: 0
Score: 100.00

Session ID: 2
Results Sheet

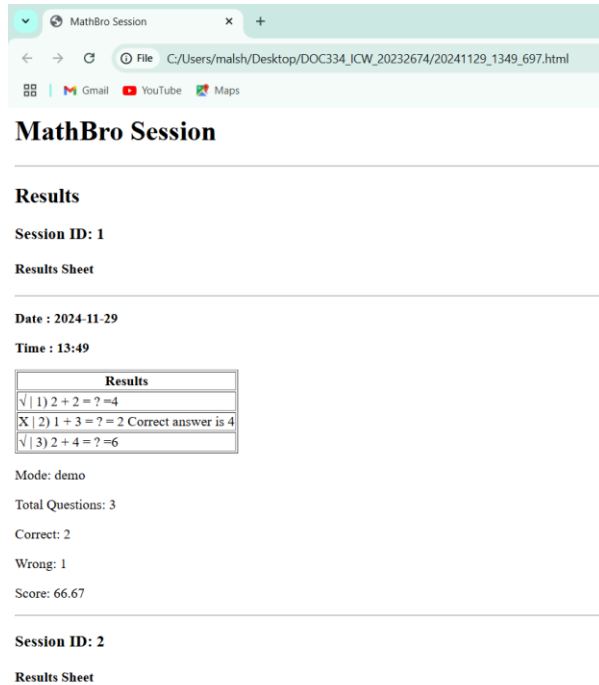
√ | 1) 20 - 13 = ? =7
√ | 2) 14 - 5 = ? =9
√ | 3) 4 * 13 = ? =52
√ | 4) 12 - 20 = ? =-8
√ | 5) 8 * 19 = ? =152
√ | 6) 13 * 4 = ? =52
√ | 7) 11 * 7 = ? =77
√ | 8) 10 * 6 = ? =60
√ | 9) 1 - 10 = ? =-9
√ | 10) 19 - 6 = ? =13

Mode: hard
Total Questions: 10
Correct: 10
Wrong: 0
Score: 100.00
```

Figure 22.Text - Hard

## 7.HTML file Screenshots

### 7.1 Demo Mode



**MathBro Session**

---

**Results**

**Session ID: 1**

**Results Sheet**

---

**Date :** 2024-11-29

**Time :** 13:49

Results	
√   1) 2 + 2 = ? =4	
X   2) 1 + 3 = ? = 2 Correct answer is 4	
√   3) 2 + 4 = ? =6	

Mode: demo

Total Questions: 3

Correct: 2

Wrong: 1

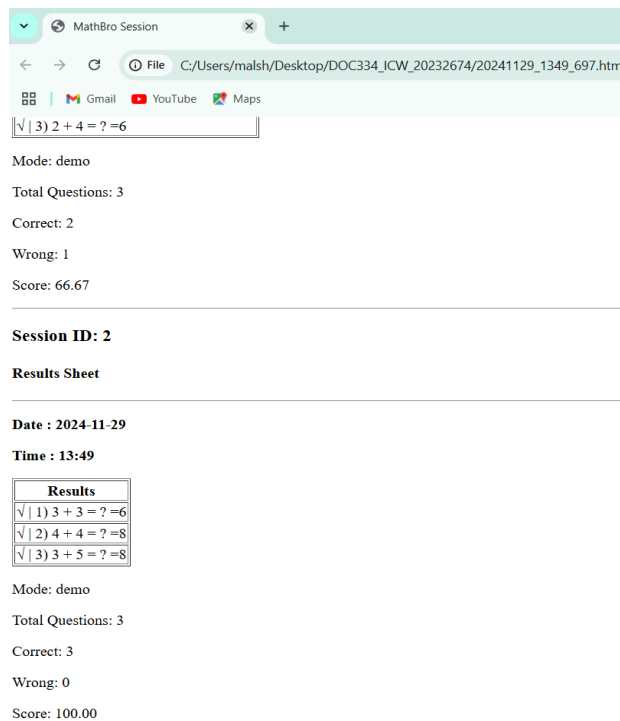
Score: 66.67

---

**Session ID: 2**

**Results Sheet**

Figure 23.Html1 - Demo



**MathBro Session**

---

**Results**

**Session ID: 2**

**Results Sheet**

---

**Date :** 2024-11-29

**Time :** 13:49

Results	
√   1) 3 + 3 = ? =6	
√   2) 4 + 4 = ? =8	
√   3) 3 + 5 = ? =8	

Mode: demo

Total Questions: 3

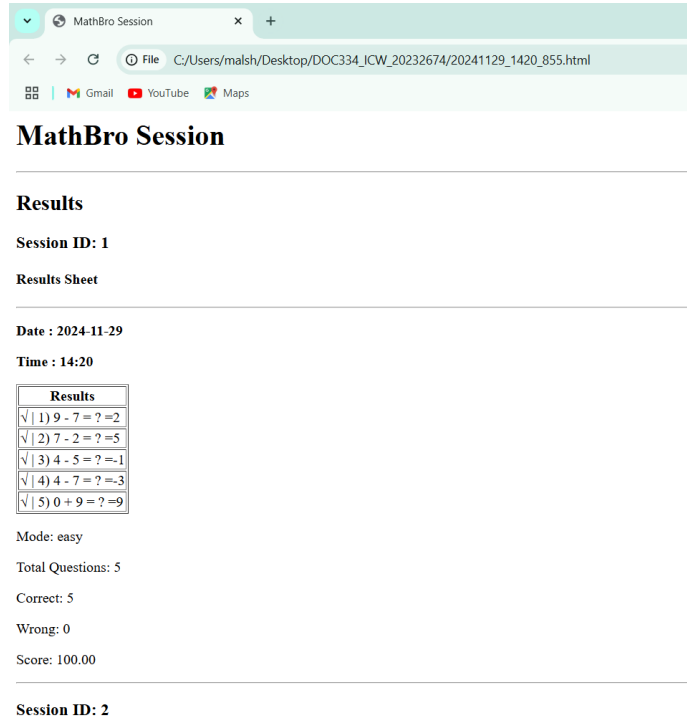
Correct: 3

Wrong: 0

Score: 100.00

Figure 24.Html2 - Demo

## 7.2 Easy Mode



**MathBro Session**

Session ID: 1

Results Sheet

Date : 2024-11-29

Time : 14:20

Results	
✓   1	$9 - 7 = ? = 2$
✓   2	$7 - 2 = ? = 5$
✓   3	$4 - 5 = ? = -1$
✓   4	$4 - 7 = ? = -3$
✓   5	$0 + 9 = ? = 9$

Mode: easy

Total Questions: 5

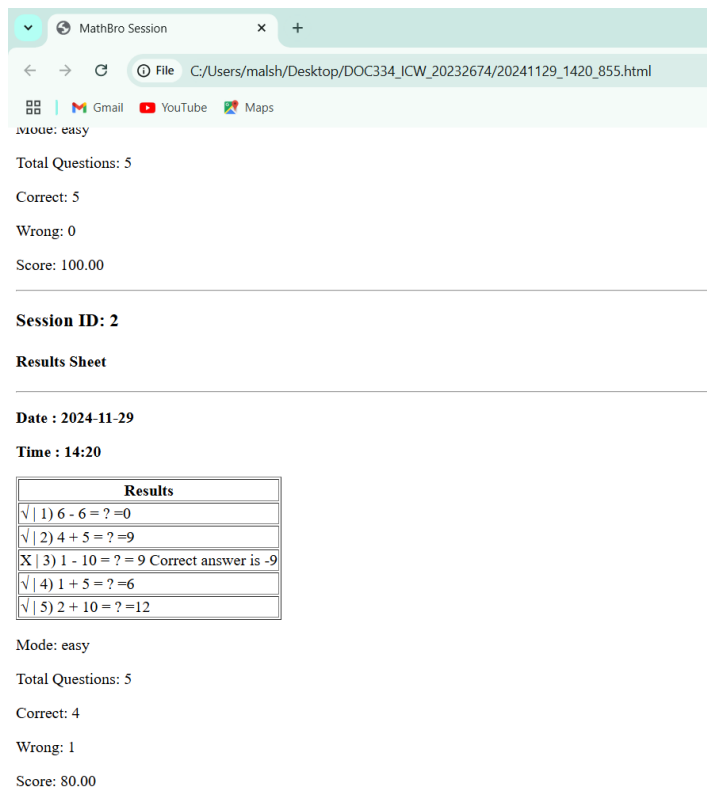
Correct: 5

Wrong: 0

Score: 100.00

Session ID: 2

Figure 25.Html1 - Easy



**MathBro Session**

Mode: easy

Total Questions: 5

Correct: 5

Wrong: 0

Score: 100.00

Session ID: 2

Results Sheet

Date : 2024-11-29

Time : 14:20

Results	
✓   1	$6 - 6 = ? = 0$
✓   2	$4 + 5 = ? = 9$
X   3	$1 - 10 = ? = 9$ Correct answer is -9
✓   4	$1 + 5 = ? = 6$
✓   5	$2 + 10 = ? = 12$

Mode: easy

Total Questions: 5

Correct: 4

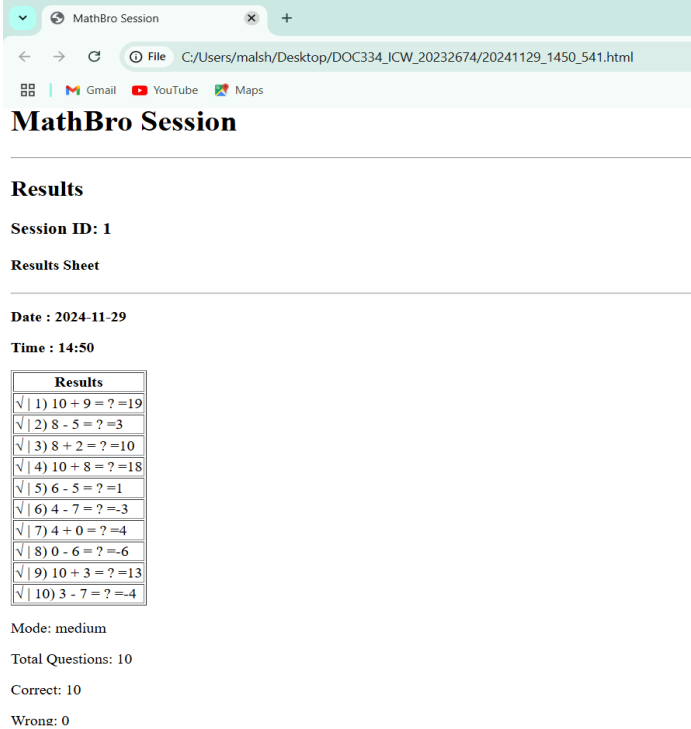
Wrong: 1

Score: 80.00

Figure 26.Html2 -Easy



## 7.3 Medium Mode



**MathBro Session**

File C:/Users/malsh/Desktop/DOC334\_ICW\_20232674/20241129\_1450\_541.html

Gmail YouTube Maps

### MathBro Session

---

#### Results

**Session ID: 1**

**Results Sheet**

---

**Date : 2024-11-29**

**Time : 14:50**

Results	
√   1)	$10 + 9 = ? = 19$
√   2)	$8 - 5 = ? = 3$
√   3)	$8 + 2 = ? = 10$
√   4)	$10 + 8 = ? = 18$
√   5)	$6 - 5 = ? = 1$
√   6)	$4 - 7 = ? = -3$
√   7)	$4 + 0 = ? = 4$
√   8)	$0 - 6 = ? = -6$
√   9)	$10 + 3 = ? = 13$
√   10)	$3 - 7 = ? = -4$

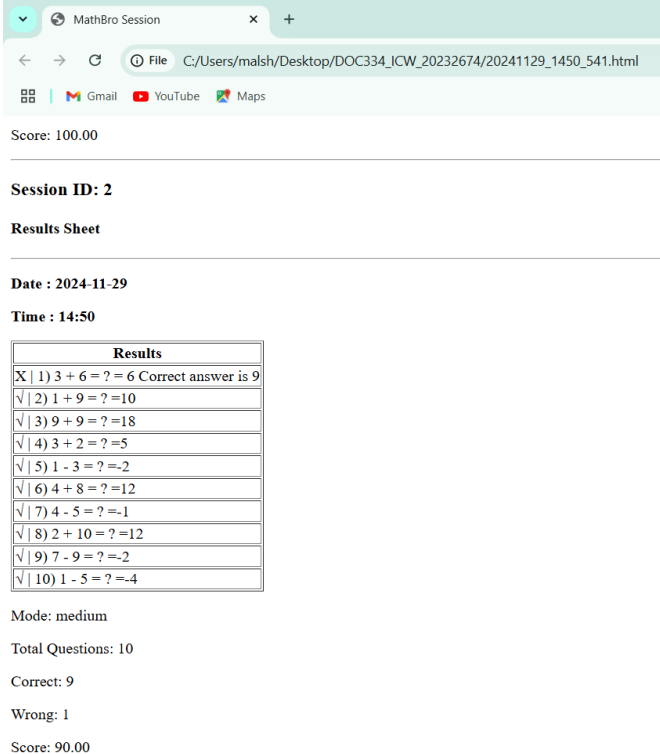
Mode: medium

Total Questions: 10

Correct: 10

Wrong: 0

Figure 27.Html1 - Medium



**MathBro Session**

File C:/Users/malsh/Desktop/DOC334\_ICW\_20232674/20241129\_1450\_541.html

Gmail YouTube Maps

Score: 100.00

---

#### Results

**Session ID: 2**

**Results Sheet**

---

**Date : 2024-11-29**

**Time : 14:50**

Results	
X   1)	$3 + 6 = ? = 6$ Correct answer is 9
√   2)	$1 + 9 = ? = 10$
√   3)	$9 + 9 = ? = 18$
√   4)	$3 + 2 = ? = 5$
√   5)	$1 - 3 = ? = -2$
√   6)	$4 + 8 = ? = 12$
√   7)	$4 - 5 = ? = -1$
√   8)	$2 + 10 = ? = 12$
√   9)	$7 - 9 = ? = -2$
√   10)	$1 - 5 = ? = -4$

Mode: medium

Total Questions: 10

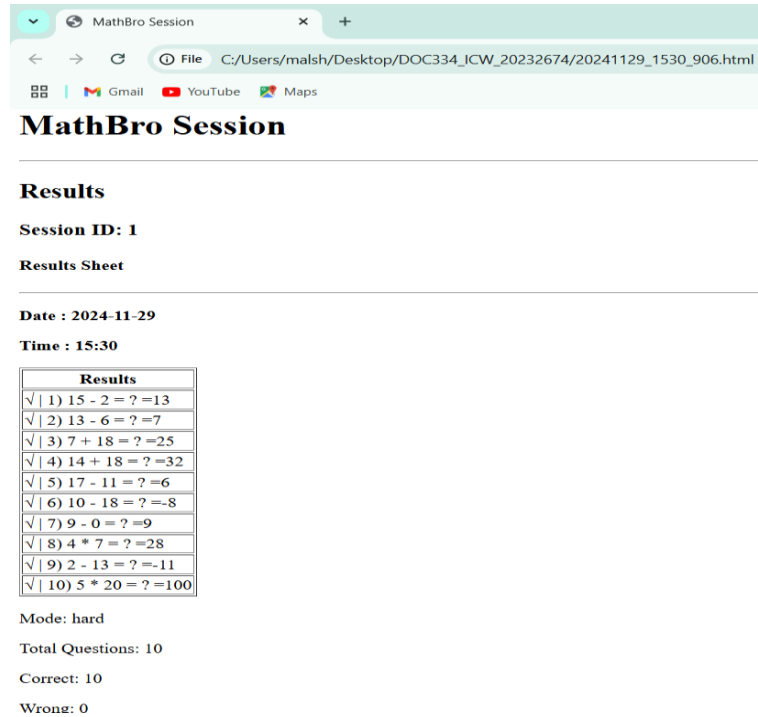
Correct: 9

Wrong: 1

Score: 90.00

Figure 28.Html2 - Medium

## 7.4 Hard Mode



**MathBro Session**

File C:/Users/malsh/Desktop/DOC334\_ICW\_20232674/20241129\_1530\_906.html

Gmail YouTube Maps

---

### MathBro Session

---

#### Results

**Session ID: 1**

**Results Sheet**

---

**Date : 2024-11-29**

**Time : 15:30**

Results	
✓   1)	$15 - 2 = ? = 13$
✓   2)	$13 - 6 = ? = 7$
✓   3)	$7 + 18 = ? = 25$
✓   4)	$14 + 18 = ? = 32$
✓   5)	$17 - 11 = ? = 6$
✓   6)	$10 - 18 = ? = -8$
✓   7)	$9 - 0 = ? = 9$
✓   8)	$4 * 7 = ? = 28$
✓   9)	$2 - 13 = ? = -11$
✓   10)	$5 * 20 = ? = 100$

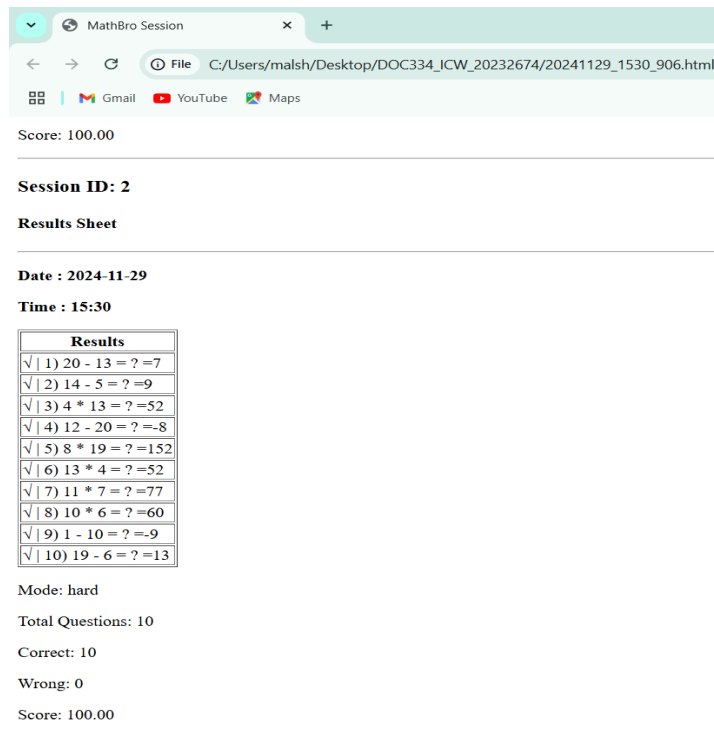
Mode: hard

Total Questions: 10

Correct: 10

Wrong: 0

Figure 29.Html1 - Hard



**MathBro Session**

File C:/Users/malsh/Desktop/DOC334\_ICW\_20232674/20241129\_1530\_906.html

Gmail YouTube Maps

---

Score: 100.00

---

**Session ID: 2**

**Results Sheet**

---

**Date : 2024-11-29**

**Time : 15:30**

Results	
✓   1)	$20 - 13 = ? = 7$
✓   2)	$14 - 5 = ? = 9$
✓   3)	$4 * 13 = ? = 52$
✓   4)	$12 - 20 = ? = -8$
✓   5)	$8 * 19 = ? = 152$
✓   6)	$13 * 4 = ? = 52$
✓   7)	$11 * 7 = ? = 77$
✓   8)	$10 * 6 = ? = 60$
✓   9)	$1 - 10 = ? = -9$
✓   10)	$19 - 6 = ? = 13$

Mode: hard

Total Questions: 10

Correct: 10

Wrong: 0

Score: 100.00

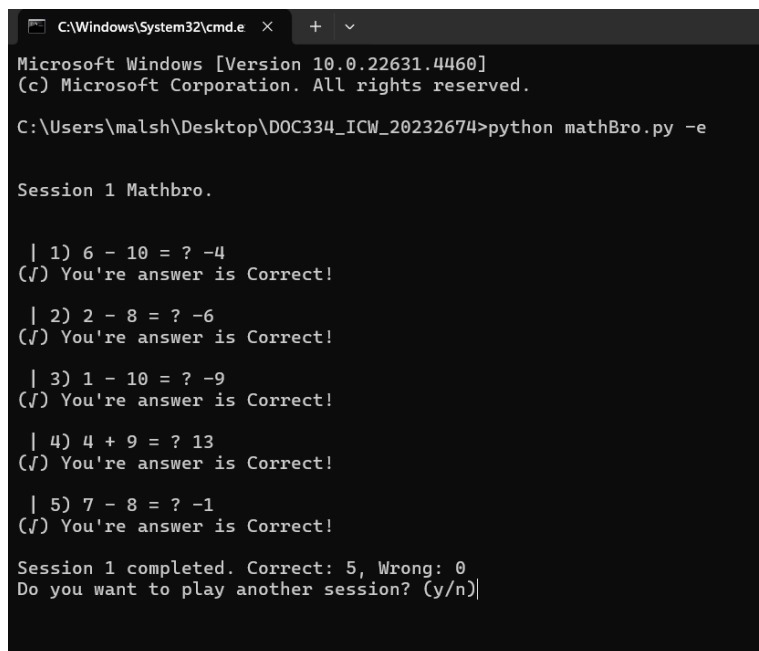
Figure 30.Html2 - Hard

## 8.Test Cases

### 8.1 Test Case 1 :-

Test Case No	Input Entered	Expected output	Actual output	Result
01	python mathBro.py -e	Mode : Easy Questions : 5 Range : 0-10 Operators : + , -	Mode : Easy Questions : 5 Range : 0-10 Operators : + , -	Pass

Table 1.Test Case 1



```
C:\Windows\System32\cmd.e  x  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -e

Session 1 Mathbro.

| 1) 6 - 10 = ? -4
(✓) You're answer is Correct!

| 2) 2 - 8 = ? -6
(✓) You're answer is Correct!

| 3) 1 - 10 = ? -9
(✓) You're answer is Correct!

| 4) 4 + 9 = ? 13
(✓) You're answer is Correct!

| 5) 7 - 8 = ? -1
(✓) You're answer is Correct!

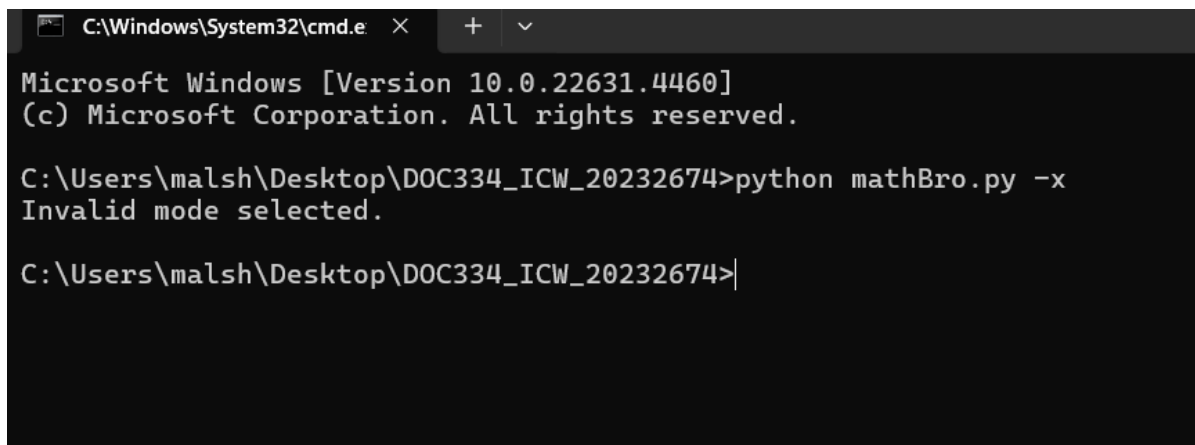
Session 1 completed. Correct: 5, Wrong: 0
Do you want to play another session? (y/n)|
```

Figure 31.Test case1

## 8.2 Test Case 2 :-

Test Case No	Input Entered	Expected output	Actual output	Result
02	python mathBro.py -x	Prints "Invalid mode selected." and exits	Prints "Invalid mode selected." and exits	Pass

Table 2.Test Case 2



```
C:\Windows\System32\cmd.e  X  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -x
Invalid mode selected.

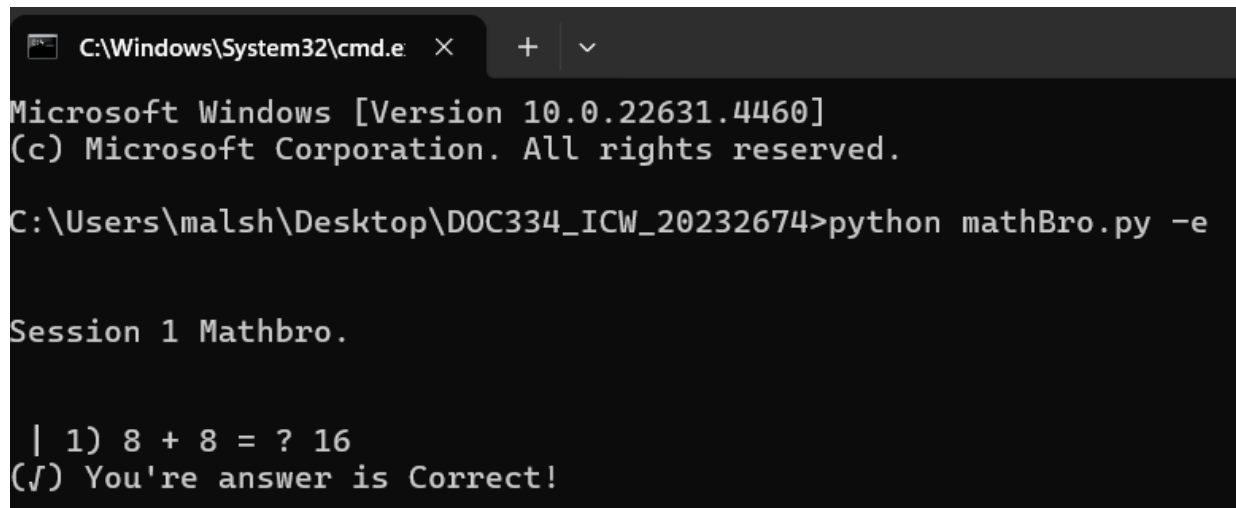
C:\Users\malsh\Desktop\DOC334_ICW_20232674>|
```

Figure 32.Test case2

### 8.3 Test Case 3 :-

Test Case No	Input Entered	Expected output	Actual output	Result
03	User enters "16" for 8 + 8	"(√) Your answer is Correct!"	"(√) Your answer is Correct!"	Pass

Table 3.Test Case 3



```
C:\Windows\System32\cmd.e  X  +  v

Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -e

Session 1 Mathbro.

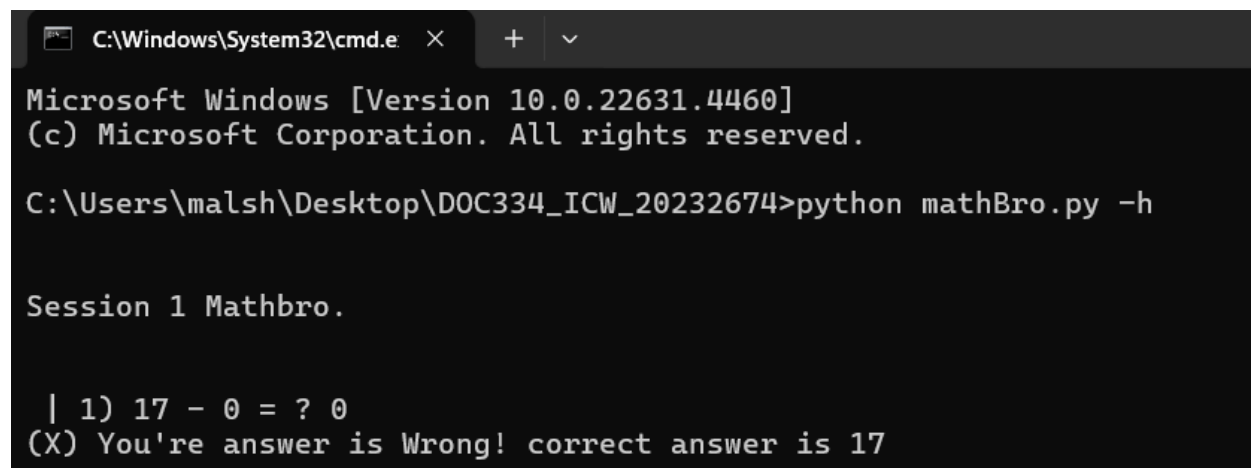
| 1) 8 + 8 = ? 16
(√) You're answer is Correct!
```

Figure 33.Test Case 3

## 8.4 Test Case 4 :-

Test Case No	Input Entered	Expected output	Actual output	Result
04	User enters "0" for 17 - 0	"(X) Your answer is Wrong! Correct answer is 17"	"(X) Your answer is Wrong! Correct answer is 17"	Pass

Table 4.Test Case 4



```
C:\Windows\System32\cmd.e  ×  +  v
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -h

Session 1 Mathbro.

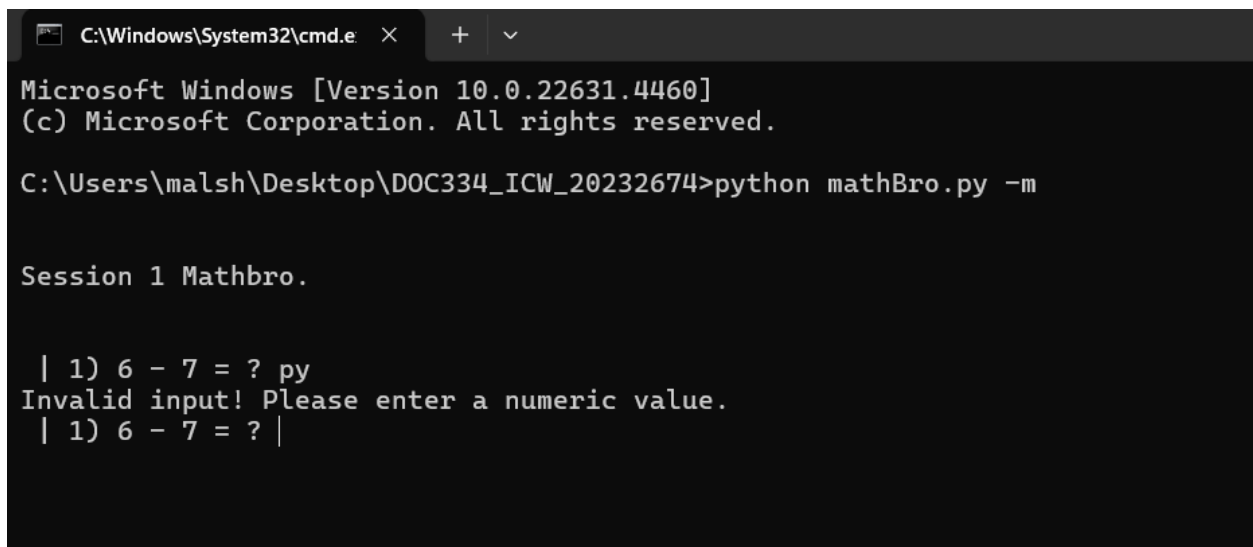
| 1) 17 - 0 = ? 0
(X) You're answer is Wrong! correct answer is 17
```

Figure 34.Test Case 4

## 8.5 Test Case 5 :-

Test Case No	Input Entered	Expected output	Actual output	Result
05	User enters “py”	“Invalid input! Please enter a numeric value.”	“Invalid input! Please enter a numeric value.”	Pass

Table 5.Test Case 5



```
C:\Windows\System32\cmd.e  ×  +  v

Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -m

Session 1 Mathbro.

| 1) 6 - 7 = ? py
Invalid input! Please enter a numeric value.
| 1) 6 - 7 = ? |
```

Figure 35.Test Case 5

## 8.6 Test Case 6 :-

Test Case No	Input Entered	Expected output	Actual output	Result
06	User enters “y” to open HTML	HTML file is generated and opens in browser	HTML file is generated and opens in browser	Pass

Table 6.Test Case 6

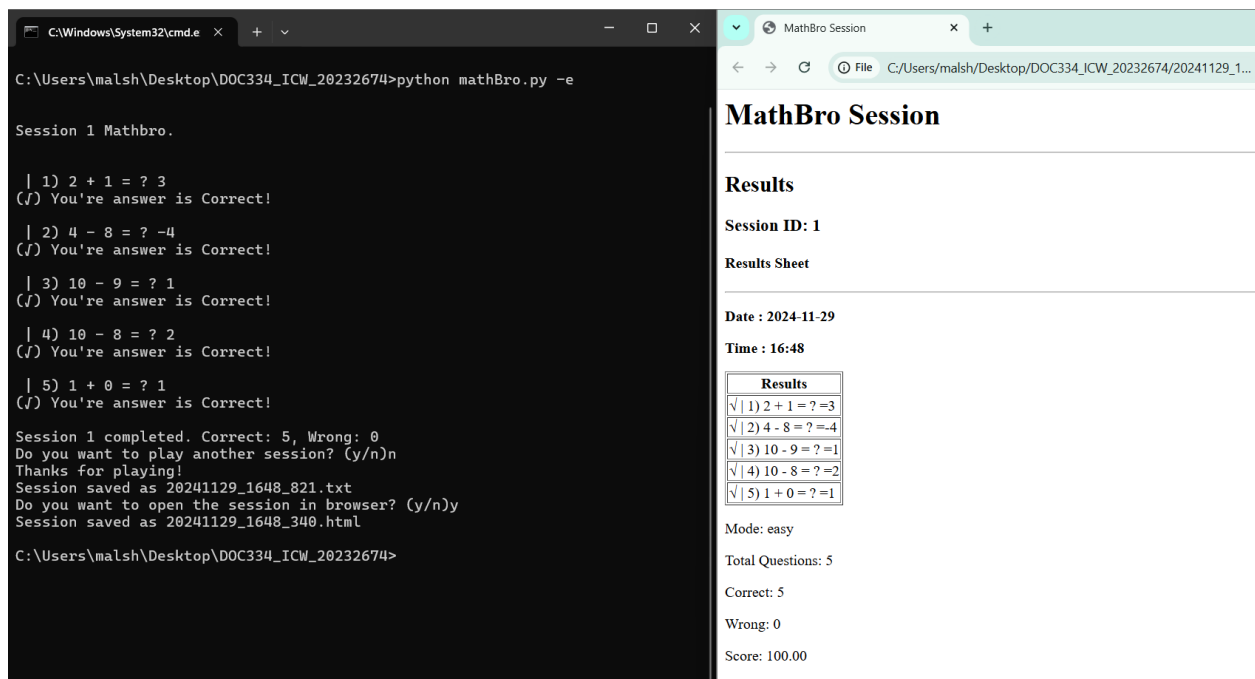


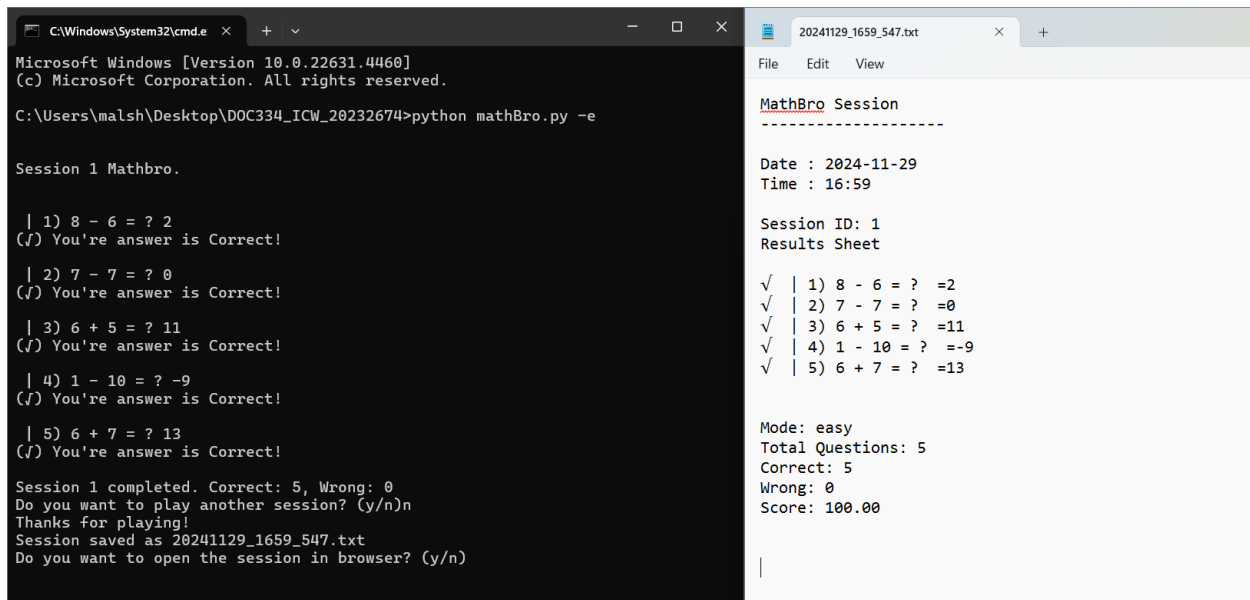
Figure 36.Test Case 6



## 8.7 Test Case 7 :-

Test Case No	Input Entered	Expected output	Actual output	Result
07	Do you want to play another session? “n”	Print “Thanks for playing!) and File created with session details	Print “Thanks for playing!) and File created with session details	Pass

Table 7.Test Case 7



The screenshot shows a Windows command prompt window on the left and a web browser window on the right. The command prompt displays the execution of a Python script named 'mathBro.py' with the argument '-e'. The script runs a session titled 'Session 1 Mathbro.' containing five math problems. All five problems are answered correctly, resulting in a score of 100.00. The session is saved as '20241129\_1659\_547.txt'. The web browser window shows the 'MathBro Session' results page, which displays the same session details, including the date (2024-11-29), time (16:59), session ID (1), and the list of five correctly answered questions.

```
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -e

Session 1 Mathbro.

| 1) 8 - 6 = ? 2
(✓) You're answer is Correct!
| 2) 7 - 7 = ? 0
(✓) You're answer is Correct!
| 3) 6 + 5 = ? 11
(✓) You're answer is Correct!
| 4) 1 - 10 = ? -9
(✓) You're answer is Correct!
| 5) 6 + 7 = ? 13
(✓) You're answer is Correct!

Session 1 completed. Correct: 5, Wrong: 0
Do you want to play another session? (y/n)n
Thanks for playing!
Session saved as 20241129_1659_547.txt
Do you want to open the session in browser? (y/n)

MathBro Session
-----
Date : 2024-11-29
Time : 16:59

Session ID: 1
Results Sheet

✓ | 1) 8 - 6 = ? =2
✓ | 2) 7 - 7 = ? =0
✓ | 3) 6 + 5 = ? =11
✓ | 4) 1 - 10 = ? =-9
✓ | 5) 6 + 7 = ? =13

Mode: easy
Total Questions: 5
Correct: 5
Wrong: 0
Score: 100.00
```

Figure 37.Test Case 7

## 8.8 Test Case 8 :-

Test Case No	Input Entered	Expected output	Actual output	Result
08	Complete 2 consecutive sessions, input “y” to continue	Both sessions saved and displayed separately	Both sessions saved and displayed separately	Pass

Table 8.Test Case8

```

C:\Windows\System32\cmd.e  x  +  v
Microsoft Windows [Version 10.0.22631.4468]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py -e

Session 1 Mathbro.

| 1) 10 + 9 = ? 19
(✓) You're answer is Correct!

| 2) 8 - 8 = ? 0
(✓) You're answer is Correct!

| 3) 7 - 9 = ? -2
(✓) You're answer is Correct!

| 4) 5 - 5 = ? 0
(✓) You're answer is Correct!

| 5) 2 - 1 = ? 1
(✓) You're answer is Correct!

Session 1 completed. Correct: 5, Wrong: 0
Do you want to play another session? (y/n)y

Session 2 Mathbro.

| 1) 8 + 6 = ? 14
(✓) You're answer is Correct!

| 2) 0 + 0 = ? 0
(✓) You're answer is Correct!

| 3) 3 - 4 = ? -1
(✓) You're answer is Correct!

| 4) 7 + 8 = ? 15
(✓) You're answer is Correct!

| 5) 0 + 8 = ? 8
(✓) You're answer is Correct!

Session 2 completed. Correct: 5, Wrong: 0
Do you want to play another session? (y/n)n
Thanks for playing!
Session saved as 20241129_1713_916.txt
Do you want to open the session in browser? (y/n)

20241129_1713_916.txt
File Edit View

MathBro Session
-----
Date : 2024-11-29
Time : 17:13

Session ID: 1
Results Sheet

✓ | 1) 10 + 9 = ? =19
✓ | 2) 8 - 8 = ? =0
✓ | 3) 7 - 9 = ? =-2
✓ | 4) 5 - 5 = ? =0
✓ | 5) 2 - 1 = ? =1

Mode: easy
Total Questions: 5
Correct: 5
Wrong: 0
Score: 100.00

Session ID: 2
Results Sheet

✓ | 1) 8 + 6 = ? =14
✓ | 2) 0 + 0 = ? =0
✓ | 3) 3 - 4 = ? =-1
✓ | 4) 7 + 8 = ? =15
✓ | 5) 0 + 8 = ? =8
  
```

Figure 38.Test Case 8

## 8.9 Test Case 9 :-

Test Case No	Input Entered	Expected output	Actual output	Result
09	5 correct out of 10 questions	Score: 50%	Score: 50%	Pass

Table 9.Test Case 9

The screenshot displays two side-by-side windows. The left window is a terminal running a Python script named 'mathBro.py'. It shows a session titled 'Session 1 Mathbro.' with 10 math questions. The questions and their results are as follows:

- 1)  $2 + 9 = ?$  11 (✓) You're answer is Correct!
- 2)  $5 - 5 = ?$  5 (X) You're answer is Wrong! correct answer is 0
- 3)  $4 - 4 = ?$  0 (✓) You're answer is Correct!
- 4)  $3 - 10 = ?$  7 (X) You're answer is Wrong! correct answer is -7
- 5)  $7 + 10 = ?$  17 (✓) You're answer is Correct!
- 6)  $9 - 8 = ?$  1 (✓) You're answer is Correct!
- 7)  $8 - 4 = ?$  4 (✓) You're answer is Correct!
- 8)  $9 + 4 = ?$  9 (X) You're answer is Wrong! correct answer is 13
- 9)  $1 + 1 = ?$  0 (X) You're answer is Wrong! correct answer is 2
- 10)  $3 - 0 = ?$  0 (X) You're answer is Wrong! correct answer is 3

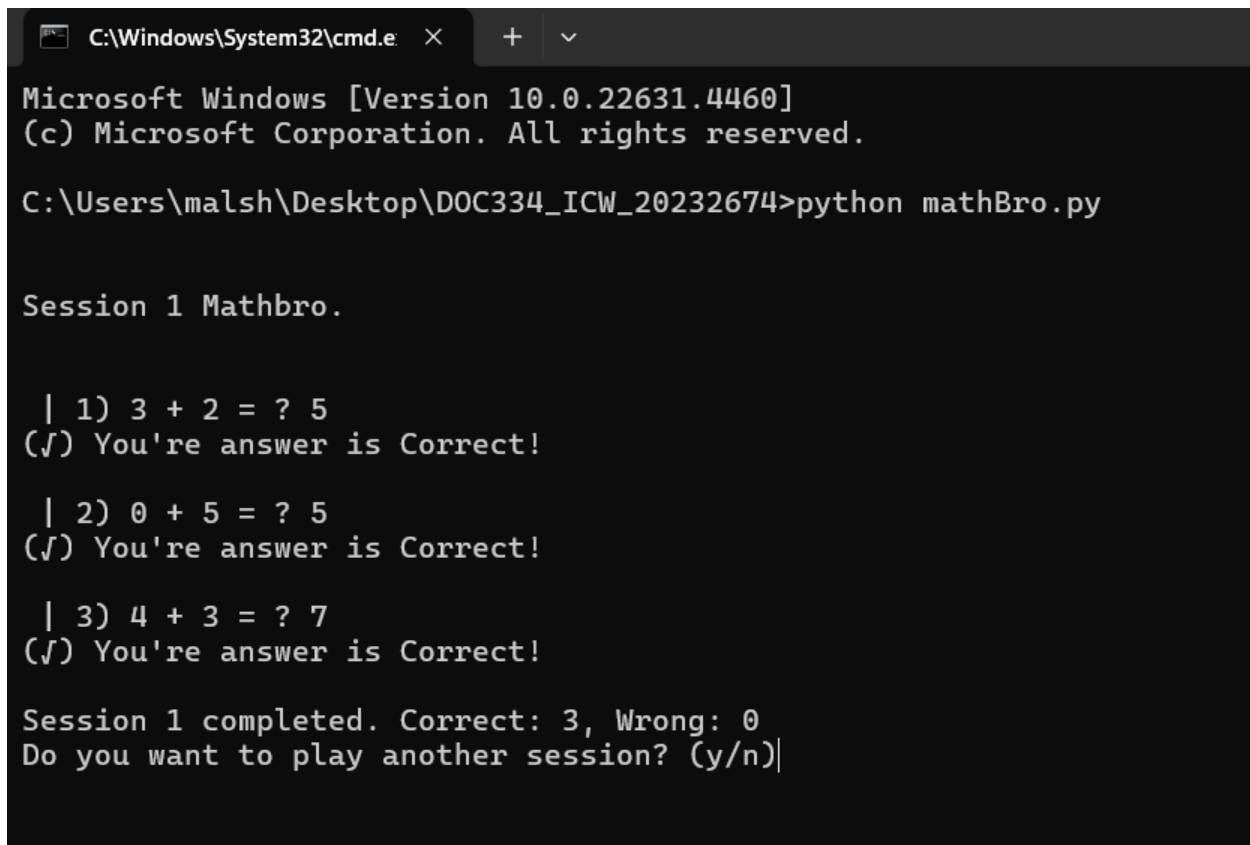
The session summary shows: Session 1 completed. Correct: 5, Wrong: 5. The user is prompted to play another session or save the session. The right window is a web browser showing the 'MathBro Session' results. It includes the date (2024-11-29), time (17:18), session ID (1), and a results sheet. The results sheet lists the same 10 questions with their correct answers and whether the user's answer was correct or incorrect. The session mode is 'medium', total questions are 10, correct answers are 5, wrong answers are 5, and the score is 50.00%.

Figure 39.Test Case 9

## 8.10 Test Case 10 :-

Test Case No	Input Entered	Expected output	Actual output	Result
10	No command-line argument	Mode : demo Questions : 3 Range : 0-5 Operators : +	Mode : demo Questions : 3 Range : 0-5 Operators : +	Pass

Table 10.Test Case 10



```
C:\Windows\System32\cmd.e × + ∨
Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\malsh\Desktop\DOC334_ICW_20232674>python mathBro.py

Session 1 Mathbro.

| 1) 3 + 2 = ? 5
(✓) You're answer is Correct!

| 2) 0 + 5 = ? 5
(✓) You're answer is Correct!

| 3) 4 + 3 = ? 7
(✓) You're answer is Correct!

Session 1 completed. Correct: 3, Wrong: 0
Do you want to play another session? (y/n)|
```

Figure 40.Test Case 10

## 9. Conclusion

Arithmetic operations-based interactive math quiz game with four difficulty levels (Demo, Easy, Medium, and Hard) is available through the MathBro application. In addition to getting instant feedback and solving randomly generated questions, users can monitor their progress via text and HTML reports. By allowing outcomes to be kept and examined, encouraging continued practice, and offering a thorough session summary, the application successfully raises learning engagement. All things considered, MathBro is a useful educational resource for getting better at math in an enjoyable and adaptable method.