Analysis Report

Seven Segment Display

Analysis of Data Display from Human-Readable to Digital Displays in the Context of I/O Technology

Introduction:

In the realm of data representation and interaction with computers, the transition from human-readable formats to digital displays plays a pivotal role. This analysis explores the mechanisms of data representation and their relevance in the context of Input/Output (I/O) technology. It delves into whether the technology employed for data display is categorized as serial or parallel I/O.

Human-Readable Data:

Human-readable data is information presented in a format that can be easily understood by a human observer. Examples of human-readable data include text, numbers, symbols, and graphical elements. Such data is usually presented in natural language or visual representations like charts and graphs. Human-readable data is the most intuitive form of information presentation.

Digital Displays:

Digital displays, on the other hand, represent data in a format that can be interpreted by electronic systems. These displays are designed to convey information in binary code, which is the fundamental language of computers. The two most common types of digital displays discussed in this analysis are seven-segment displays and matrix displays.

Seven-Segment Display:

A seven-segment display is a digital display technology that is used to represent numbers, letters, and some special characters. It consists of seven individual segments, each of which can be turned on or off to create a combination of illuminated segments, forming the desired character. Seven-segment displays are a simple and cost-effective way to display numeric data and are often used in digital clocks, calculators, and various electronic devices.

Parallel I/O Technology:

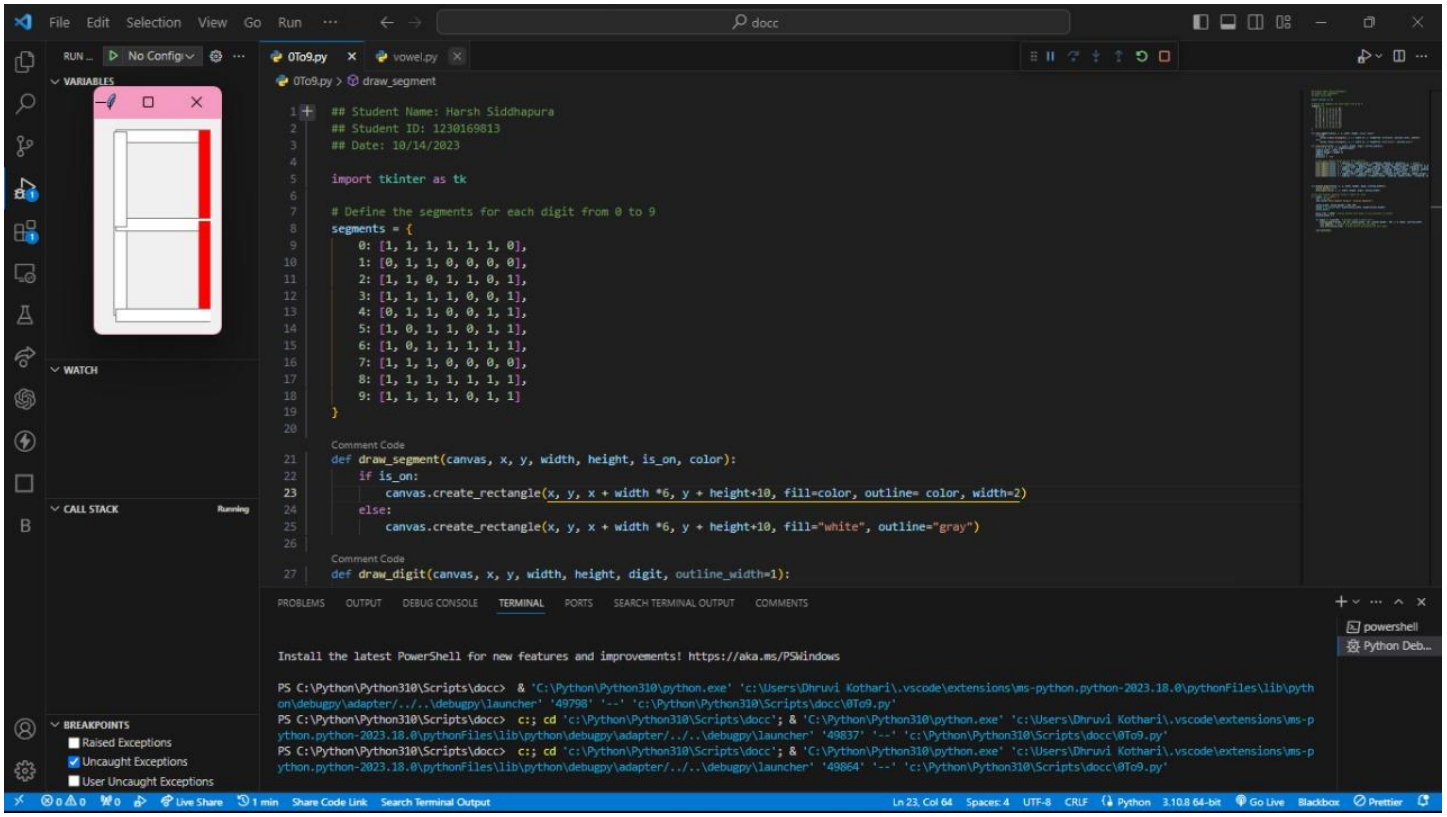
When discussing the connection between data sources and digital displays, the use of parallel I/O technology is prominent. Parallel I/O technology involves the simultaneous transmission of multiple bits (usually 8 or more) of data through multiple parallel lines. In the case of seven-segment displays, each of the seven segments is controlled by an individual line or bit. These parallel lines allow for precise control over each segment, enabling the display of specific characters. Parallel I/O is characterized by its capacity to transmit data in parallel, meaning that several bits of data are transmitted simultaneously.

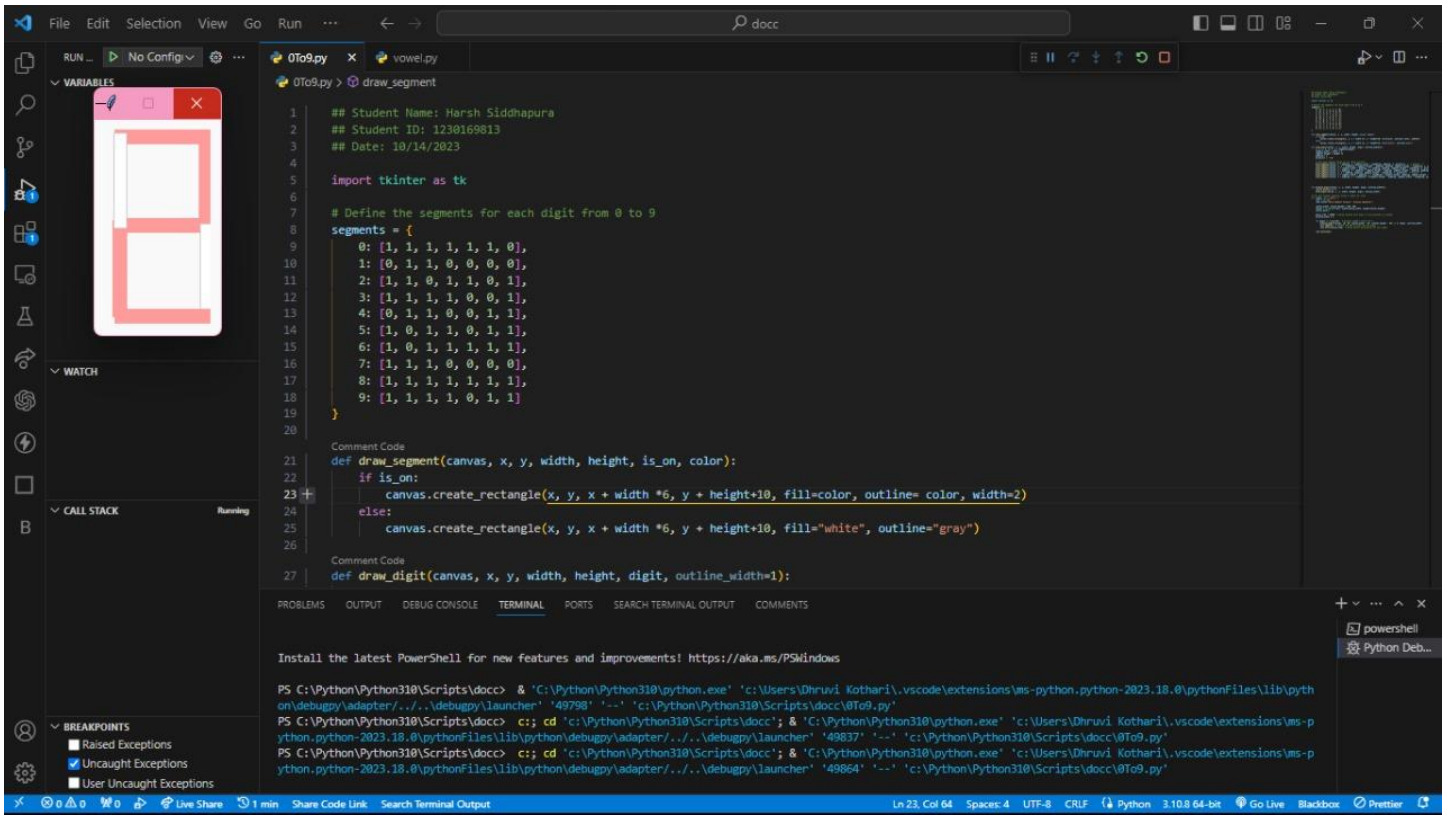
Conclusion:

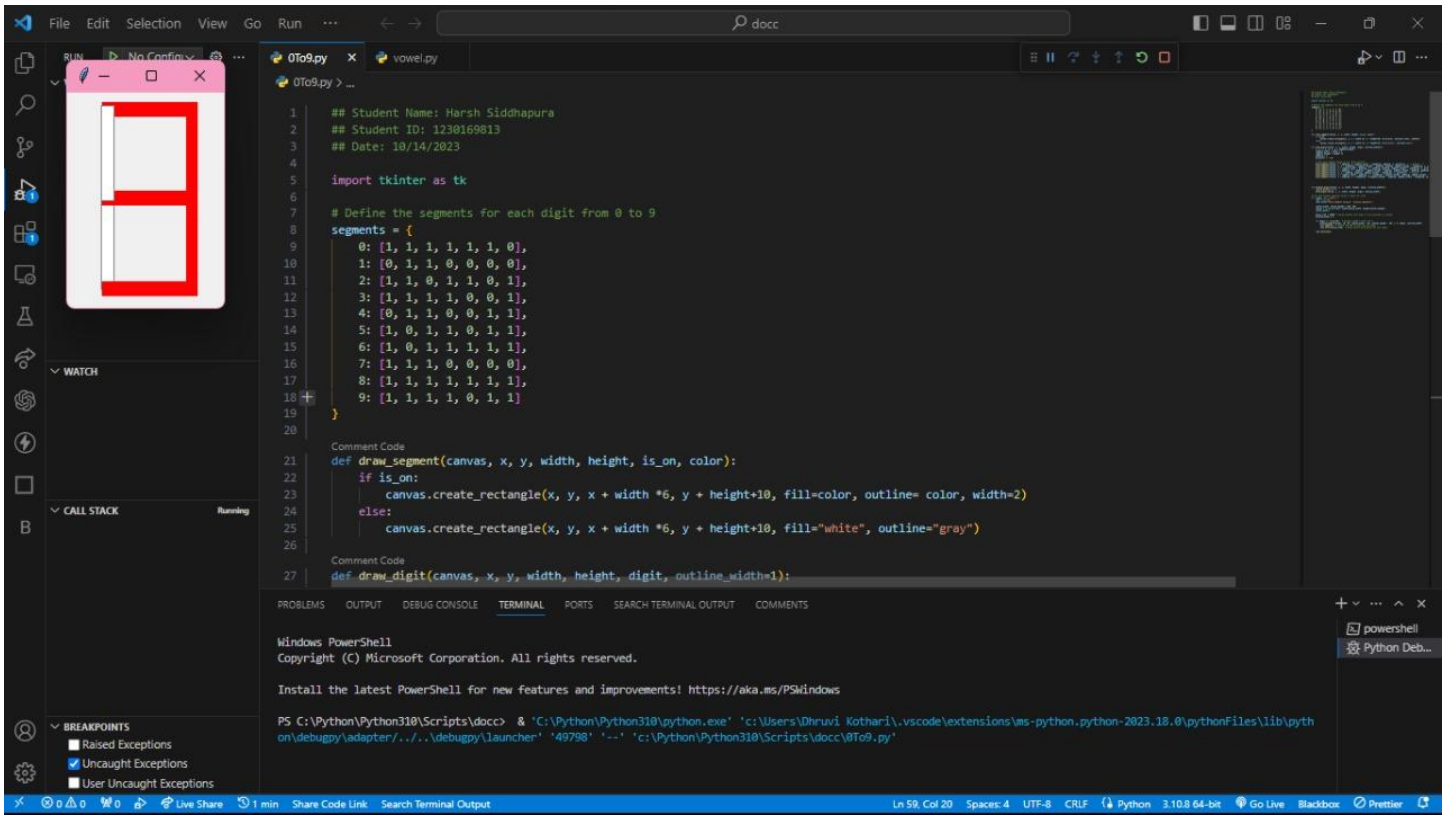
In summary, the transition from human-readable data to digital displays, particularly seven-segment displays, involves a shift from an easily interpretable format to a binary representation. This shift is necessary for electronic systems to process and present data efficiently. The technology employed for driving seven-segment displays falls under the category of parallel I/O. Each of the seven segments is controlled in parallel through individual lines or bits, allowing for precise character representation. This analysis highlights the significance of digital displays and the role of parallel I/O technology in bridging the gap between human-readable data and digital representation in the computing domain.

Screenshot

0 to 9 - 7 Segment Display






File Edit Selection View Go Run
docc
0To9.py
vowel.py
Student Name: Harsh Siddhapura
Student ID: 1230169813
Date: 10/14/2023
import tkinter as tk
# Define the segments for each digit from 0 to 9
segments = {
0: [1, 1, 1, 1, 1, 1, 0],
1: [0, 1, 1, 0, 0, 0, 0],
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3: [1, 1, 1, 1, 0, 0, 1],
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7: [1, 1, 1, 0, 0, 0, 0],
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9: [1, 1, 1, 1, 0, 1, 1]
}
Comment Code
def draw_segment(canvas, x, y, width, height, is_on, color):
if is_on:
canvas.create_rectangle(x, y, x + width *6, y + height+10, fill=color, outline= color, width=2)
else:
canvas.create_rectangle(x, y, x + width *6, y + height+10, fill="white", outline="gray")
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CALL STACK
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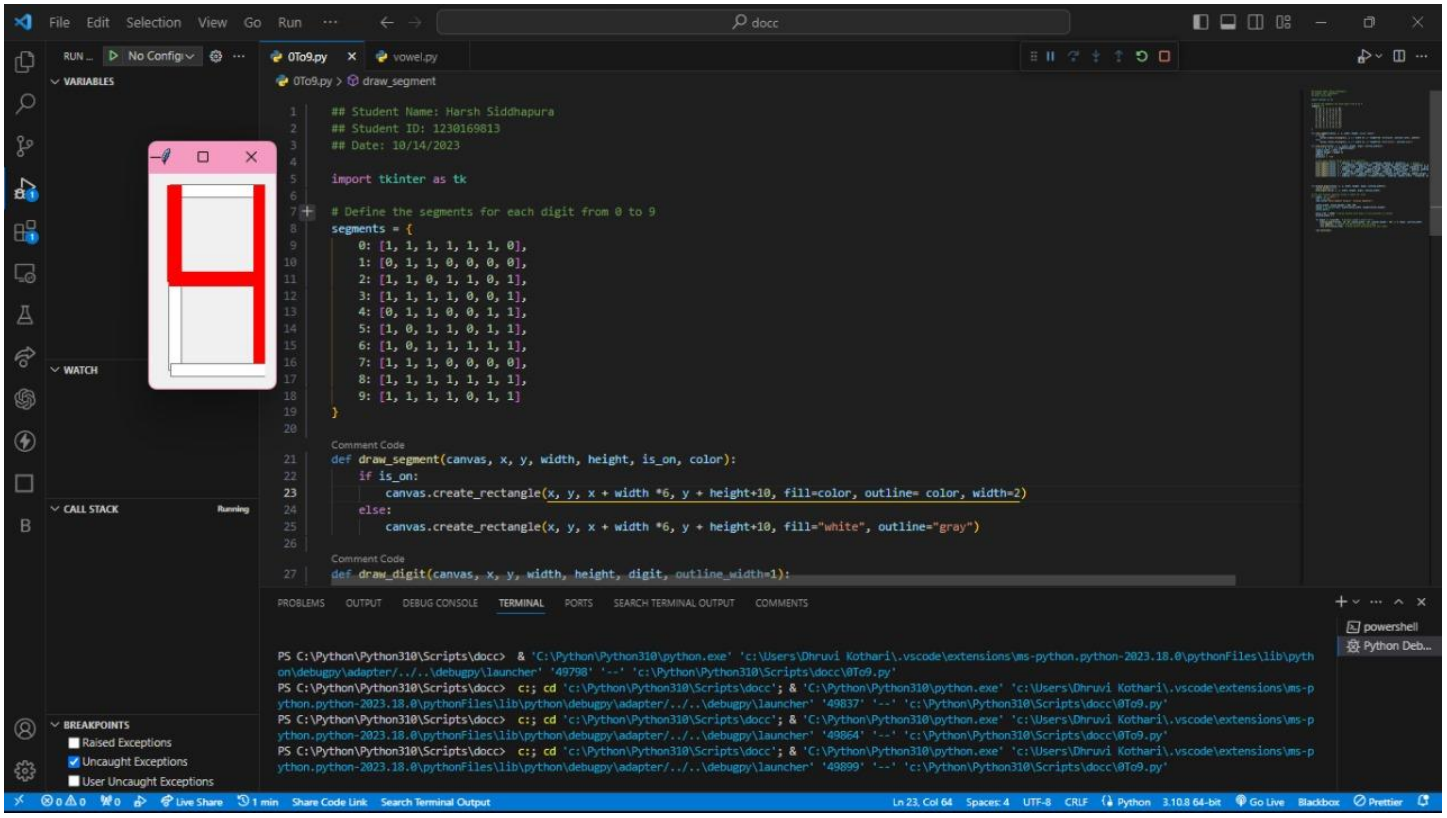
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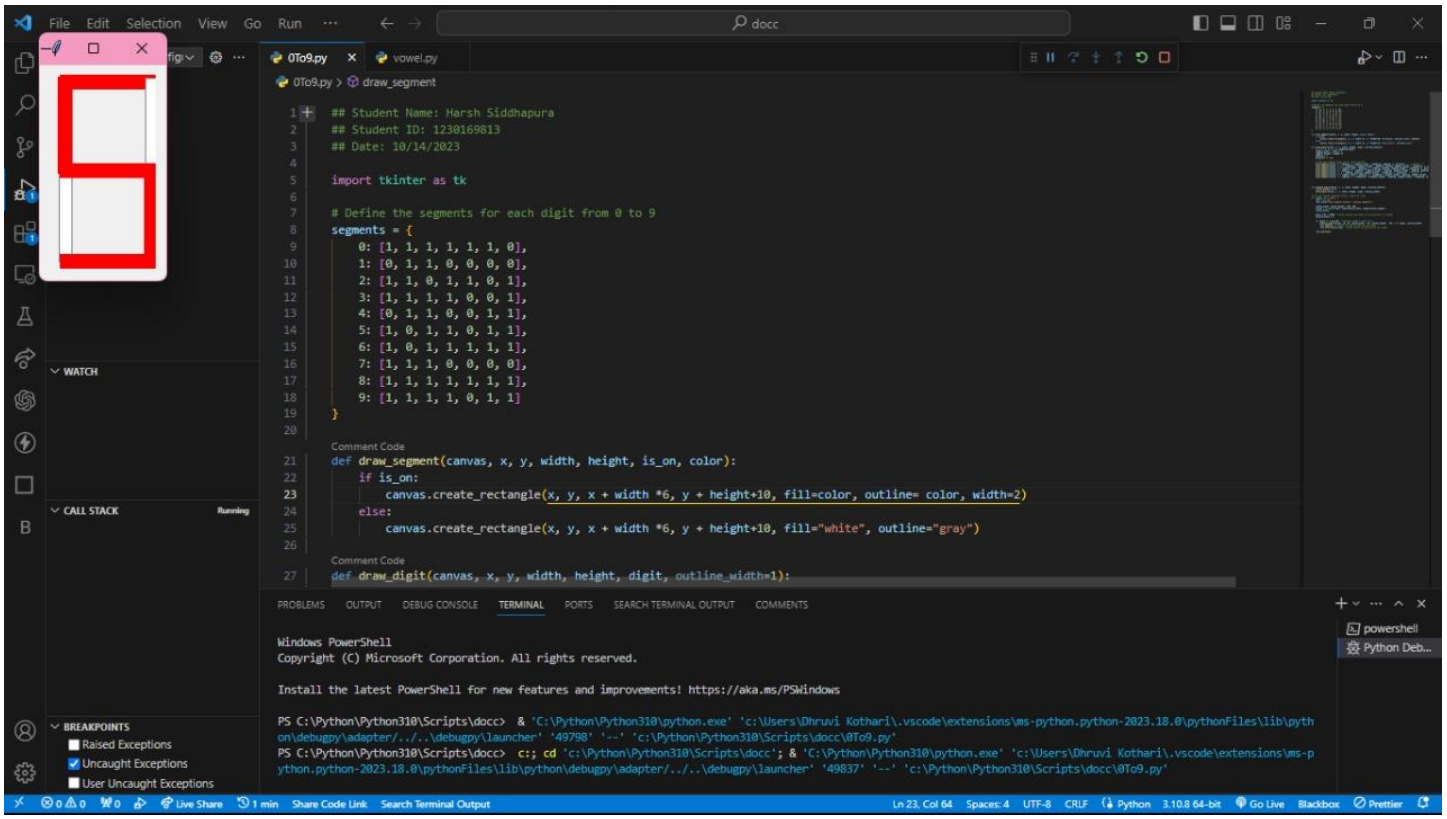
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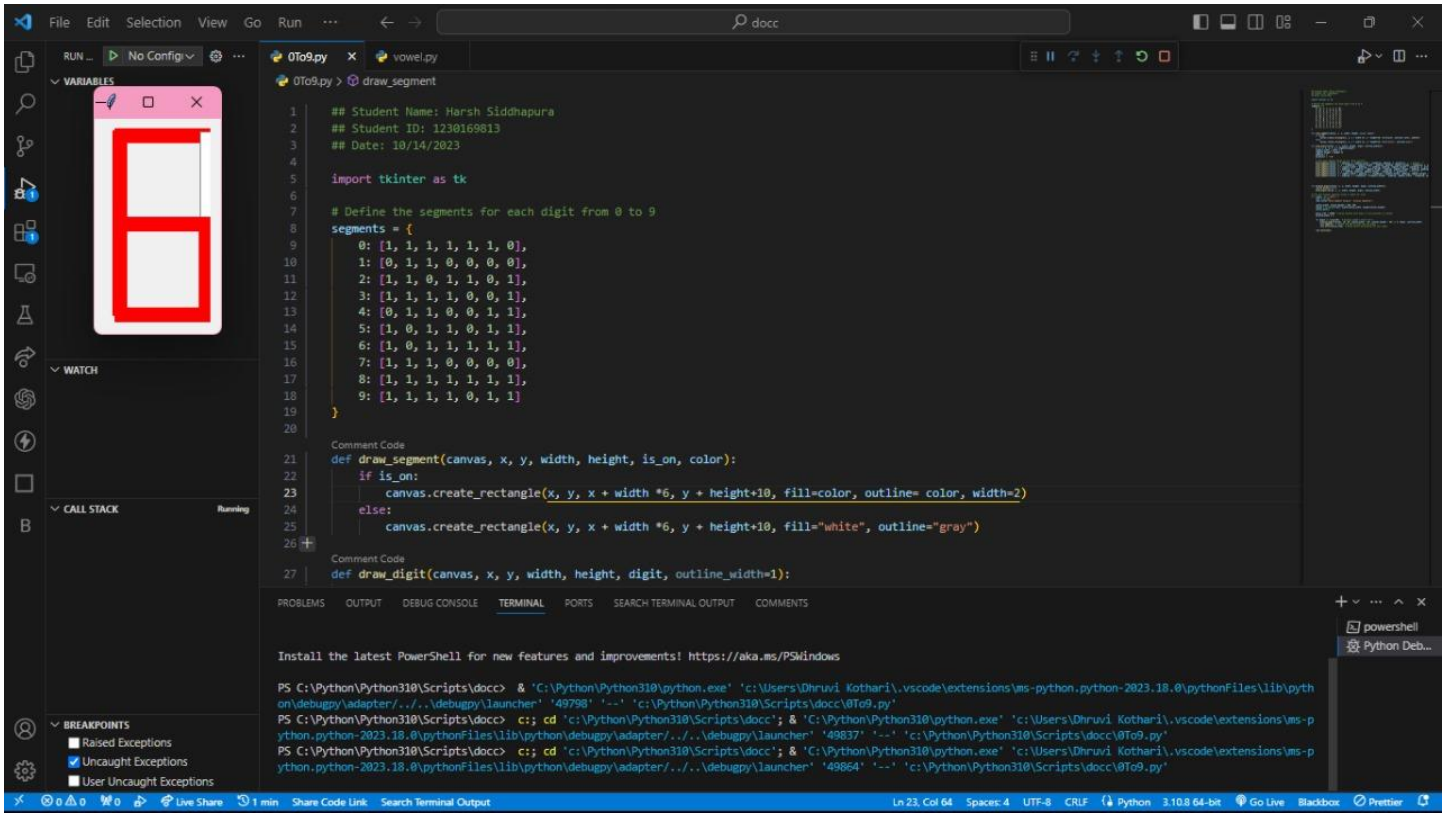
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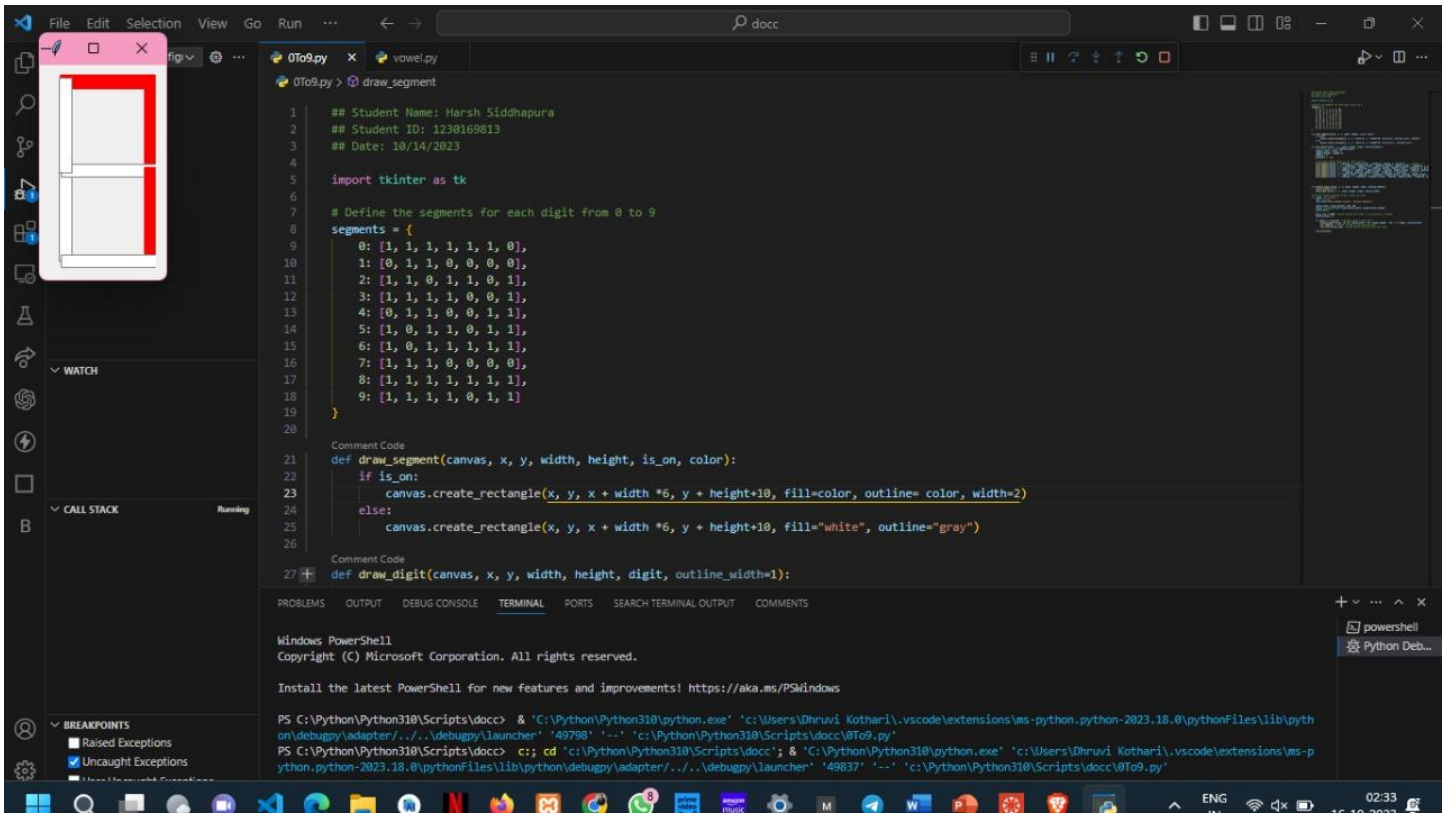
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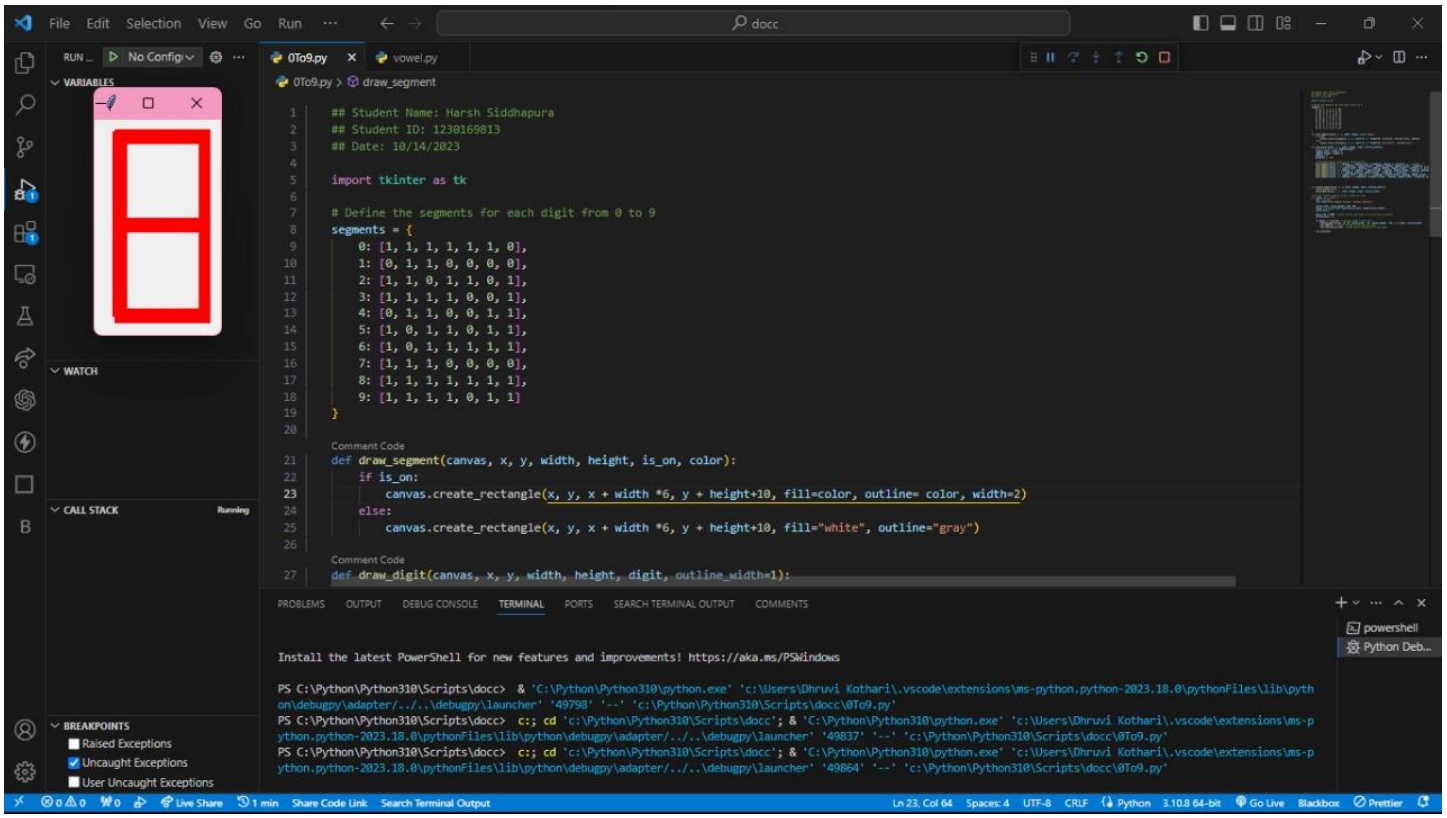
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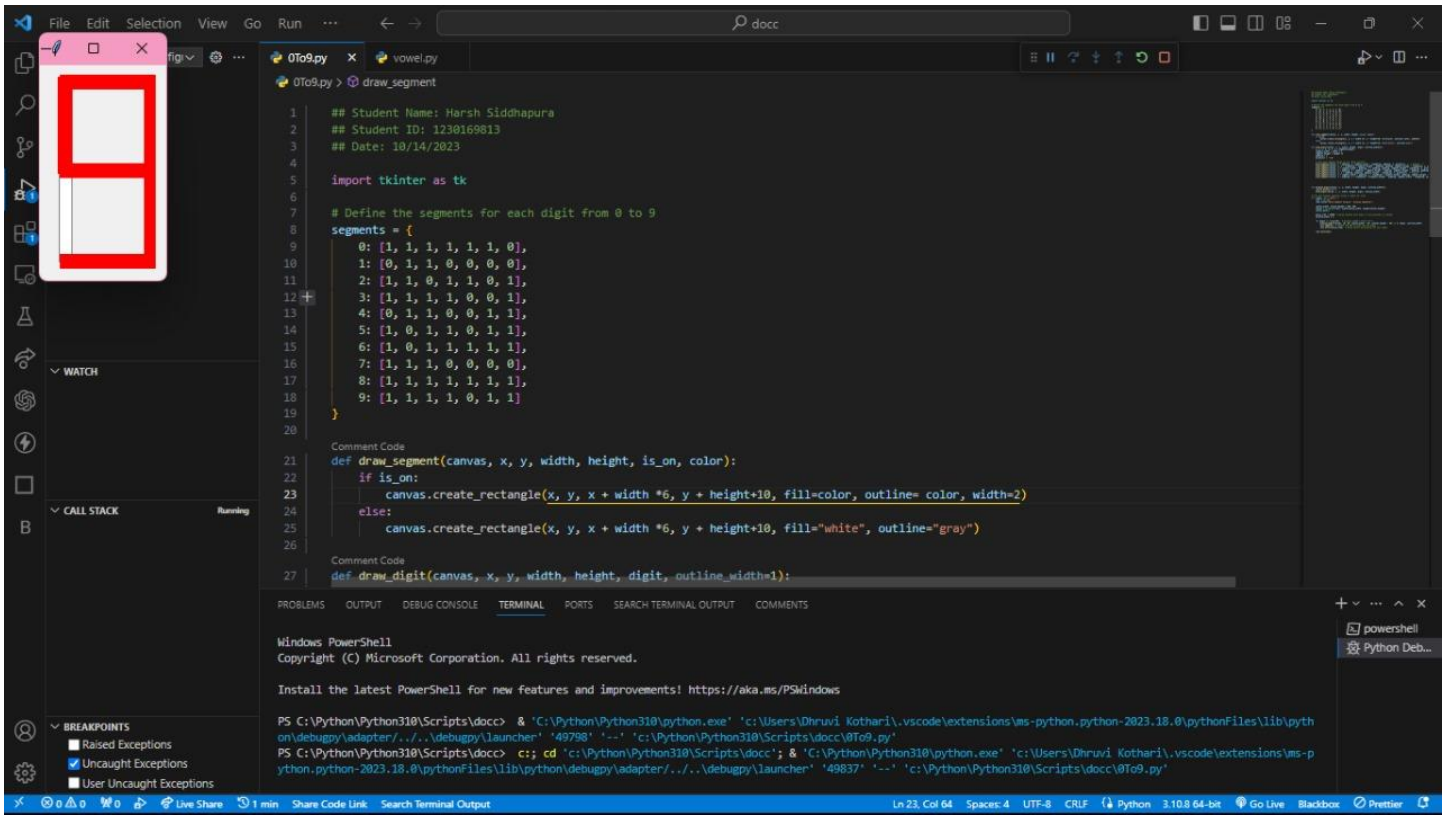
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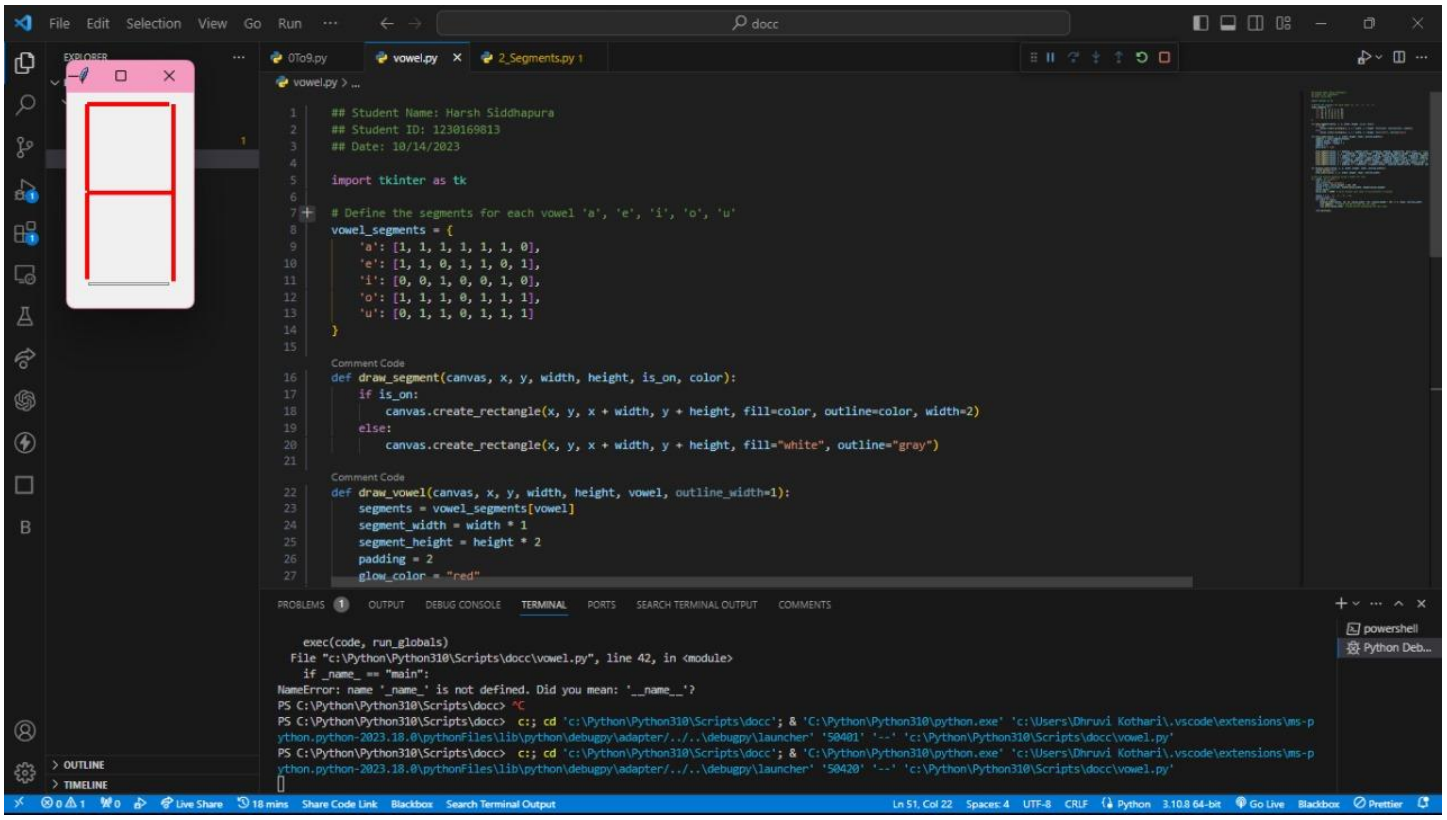

```
## Student Name: Harsh Siddhapura
## Student ID: 1230169813
## Date: 10/14/2023

import tkinter as tk

# Define the segments for each vowel 'a', 'e', 'i', 'o', 'u'
vowel_segments = {
    'a': [1, 1, 1, 1, 1, 1, 0],
    'e': [1, 1, 0, 1, 1, 0, 1],
    'i': [0, 0, 1, 0, 0, 1, 0],
    'o': [1, 1, 1, 0, 1, 1, 1],
    'u': [0, 1, 1, 0, 1, 1, 1]
}

Comment Code
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    else:
        canvas.create_rectangle(x, y, x + width, y + height, fill="white", outline="gray")

Comment Code
def draw_vowel(canvas, x, y, width, height, vowel, outline_width=1):
    segments = vowel_segments[vowel]
    segment_width = width * 1
    segment_height = height * 2
    padding = 2
    glow_color = "red"
```
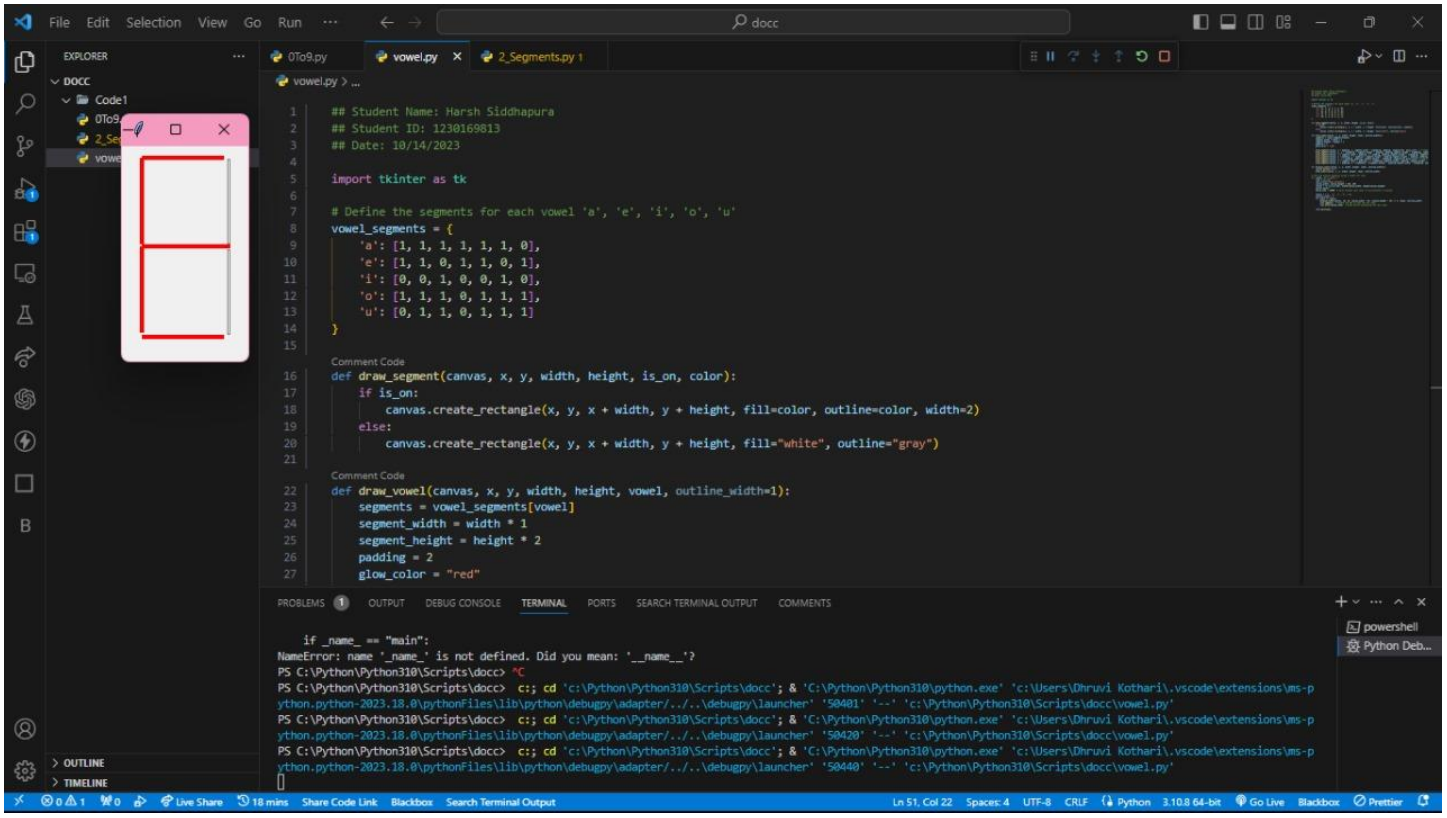
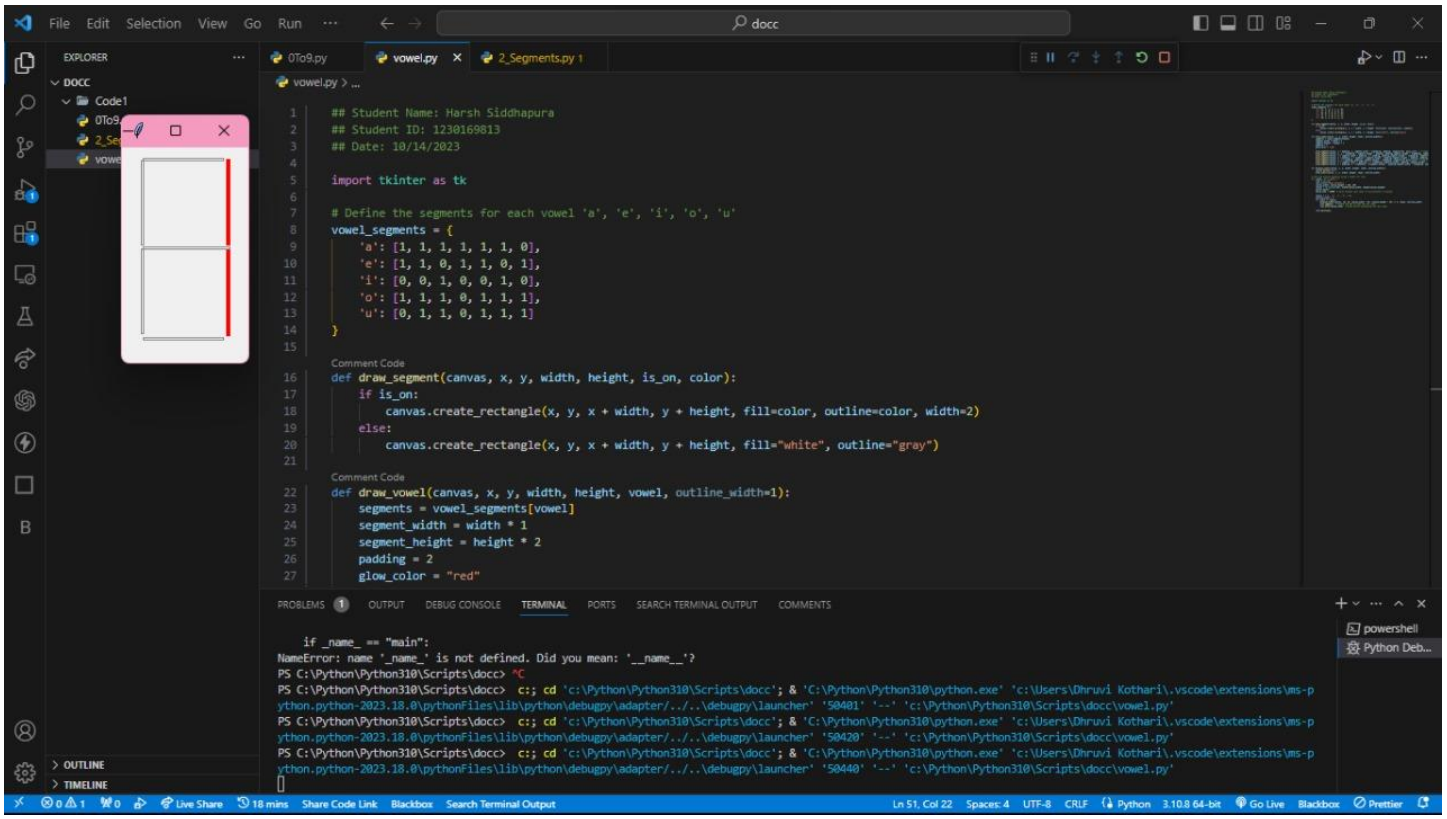
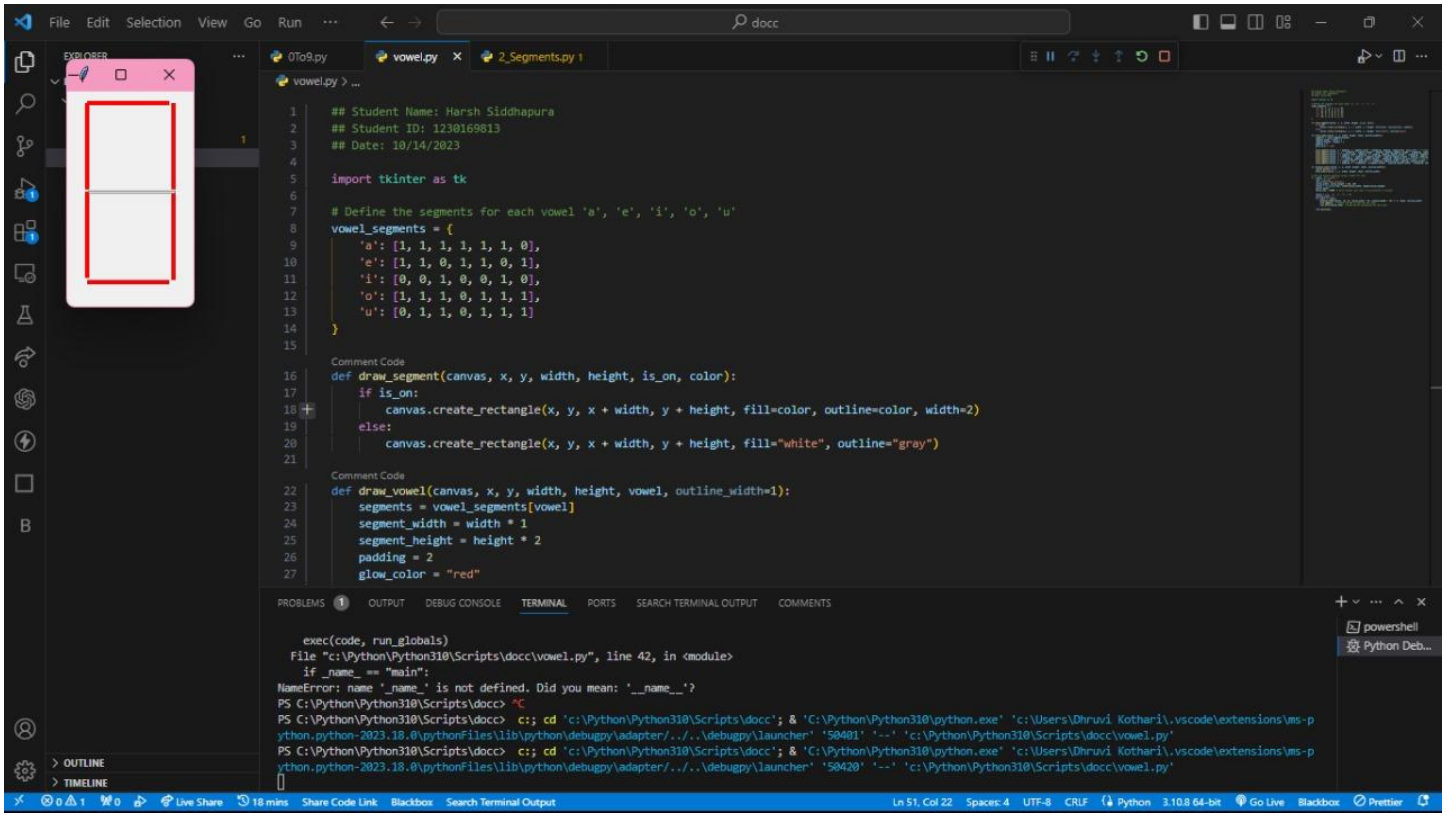

```
    exec(code, run_globals)
  File "c:\Python\Python310\Scripts\docc\vowel.py", line 42, in <module>
    if _name_ == "main":
NameError: name '_name_' is not defined. Did you mean: '__name__'?
PS C:\Python\Python310\Scripts\docc> ^C
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50401' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50420' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
```

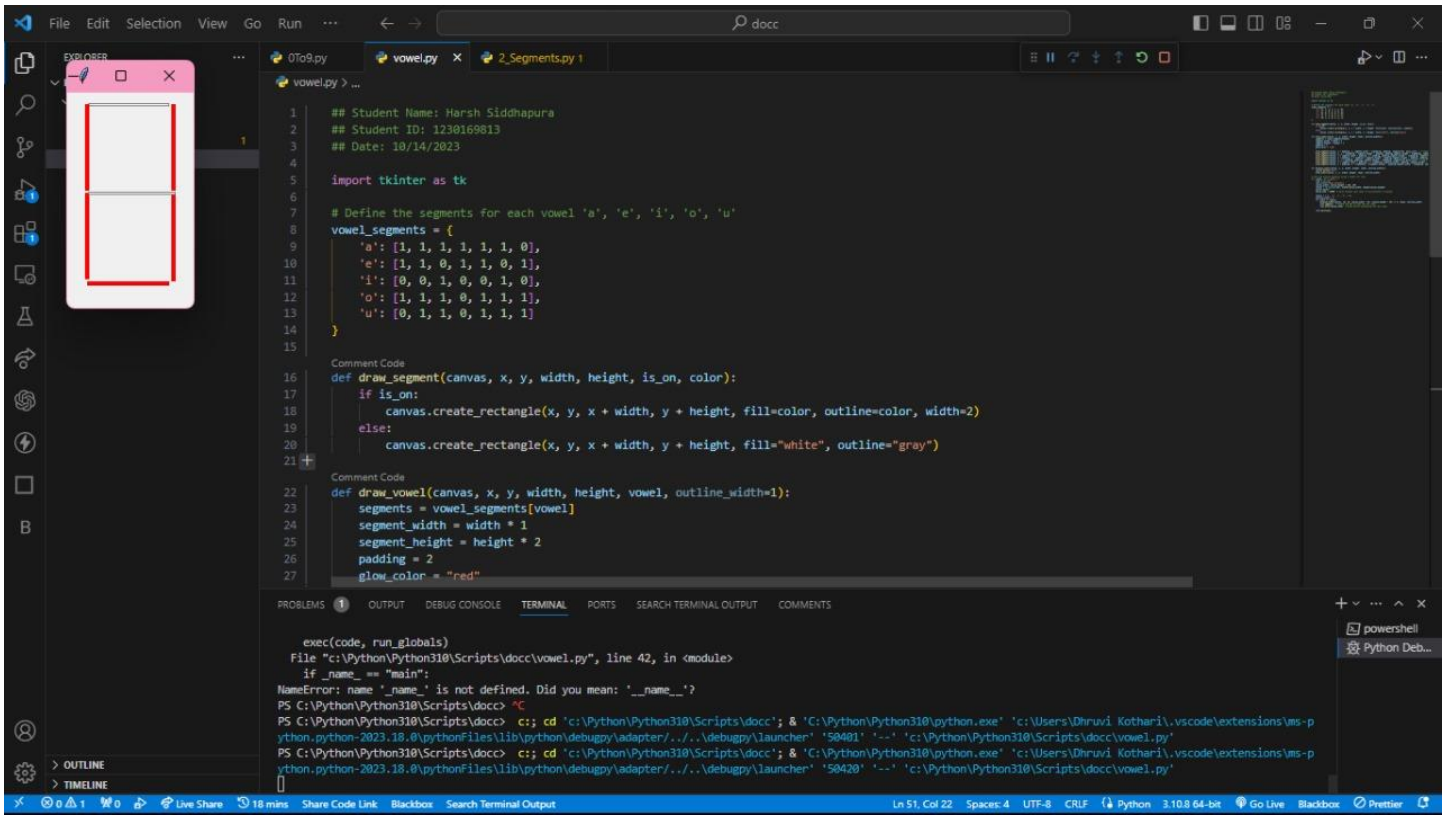


```
## Student Name: Harsh Siddhapura
## Student ID: 1230169813
## Date: 10/14/2023

import tkinter as tk

# Define the segments for each vowel 'a', 'e', 'i', 'o', 'u'
vowel_segments = {
    'a': [1, 1, 1, 1, 1, 1, 0],
    'e': [1, 1, 0, 1, 1, 0, 1],
    'i': [0, 0, 1, 0, 0, 1, 0],
    'o': [1, 1, 1, 0, 1, 1, 1],
    'u': [0, 1, 1, 0, 1, 1, 1]
}

Comment Code
def draw_segment(canvas, x, y, width, height, is_on, color):
    if is_on:
        canvas.create_rectangle(x, y, x + width, y + height, fill=color, outline=color, width=2)
    else:
        canvas.create_rectangle(x, y, x + width, y + height, fill="white", outline="gray")

Comment Code
def draw_vowel(canvas, x, y, width, height, vowel, outline_width=1):
    segments = vowel_segments[vowel]
    segment_width = width * 1
    segment_height = height * 2
    padding = 2
    glow_color = "red"
```

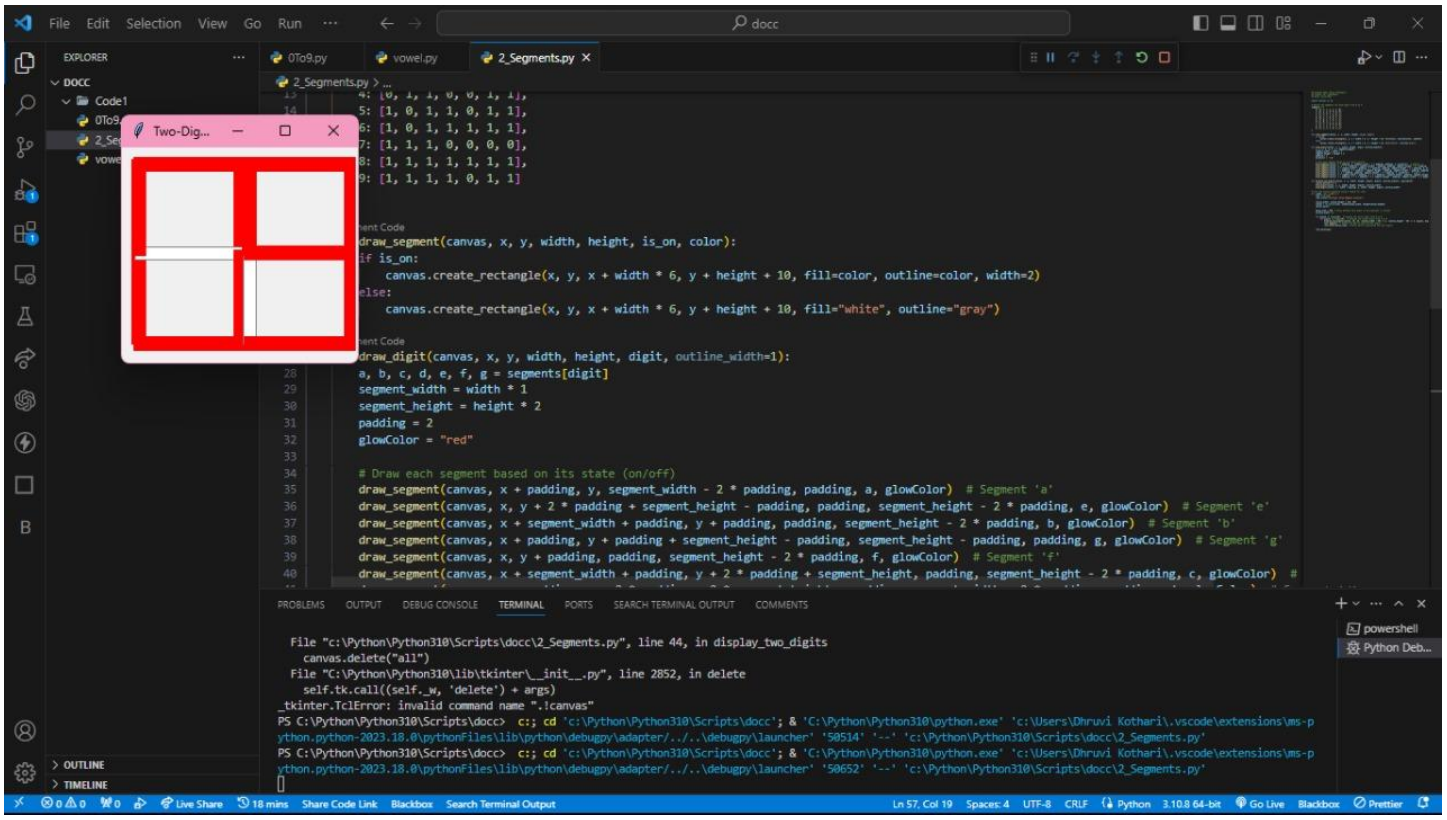
```
    if _name_ == "main":
NameError: name '_name_' is not defined. Did you mean: '__name__'?
PS C:\Python\Python310\Scripts\docc> ^C
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50401' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50420' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50440' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
```

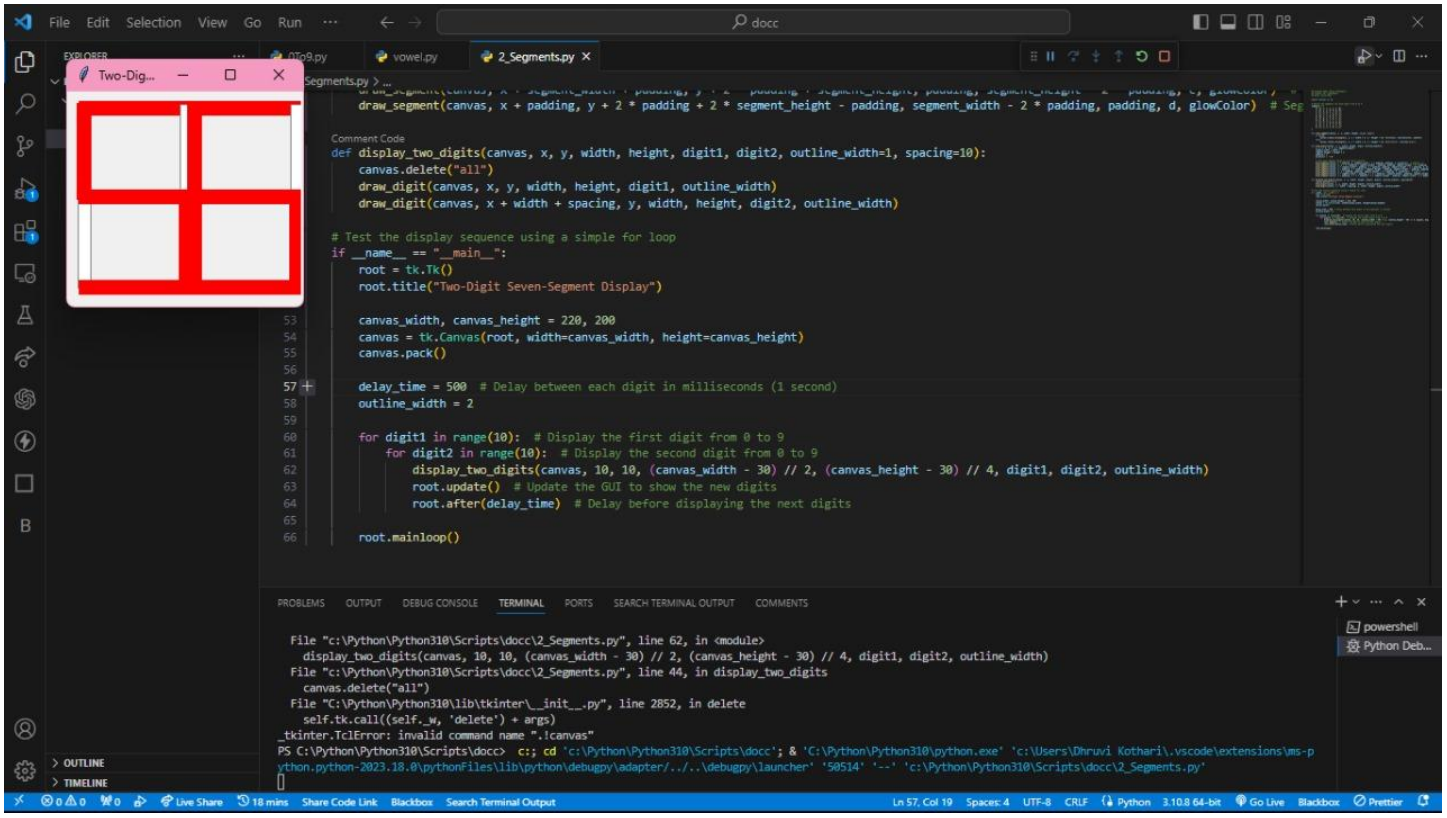

File Edit Selection View Go Run
docc
EXPLORER
DOCC
Code1
0To9.py
vowel.py
2_Segments.py 1
vowel.py > ...
Student Name: Harsh Siddhapura
Student ID: 1230169813
Date: 10/14/2023
import tkinter as tk
# Define the segments for each vowel 'a', 'e', 'i', 'o', 'u'
vowel_segments = {
'a': [1, 1, 1, 1, 1, 1, 0],
'e': [1, 1, 0, 1, 1, 0, 1],
'i': [0, 0, 1, 0, 0, 1, 0],
'o': [1, 1, 1, 0, 1, 1, 1],
'u': [0, 1, 1, 0, 1, 1, 1]
}
Comment Code
def draw_segment(canvas, x, y, width, height, is_on, color):
if is_on:
canvas.create_rectangle(x, y, x + width, y + height, fill=color, outline=color, width=2)
else:
canvas.create_rectangle(x, y, x + width, y + height, fill="white", outline="gray")
Comment Code
def draw_vowel(canvas, x, y, width, height, vowel, outline_width=1):
segments = vowel_segments[vowel]
segment_width = width * 1
segment_height = height * 2
padding = 2
glow_color = "red"
PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS SEARCH TERMINAL OUTPUT COMMENTS
if _name_ == "main":
NameError: name '_name_' is not defined. Did you mean: '__name__'?
PS C:\Python\Python310\Scripts\docc> ^C
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50401' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50420' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50440' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
powershell
Python Deb...
OUTLINE
TIMELINE
Live Share 18 mins Share Code Link Blackbox Search Terminal Output
Ln 51, Col 22 Spaces: 4 UTF-8 CRLF Python 3.10.8 64-bit Go Live Blackbox Prettier

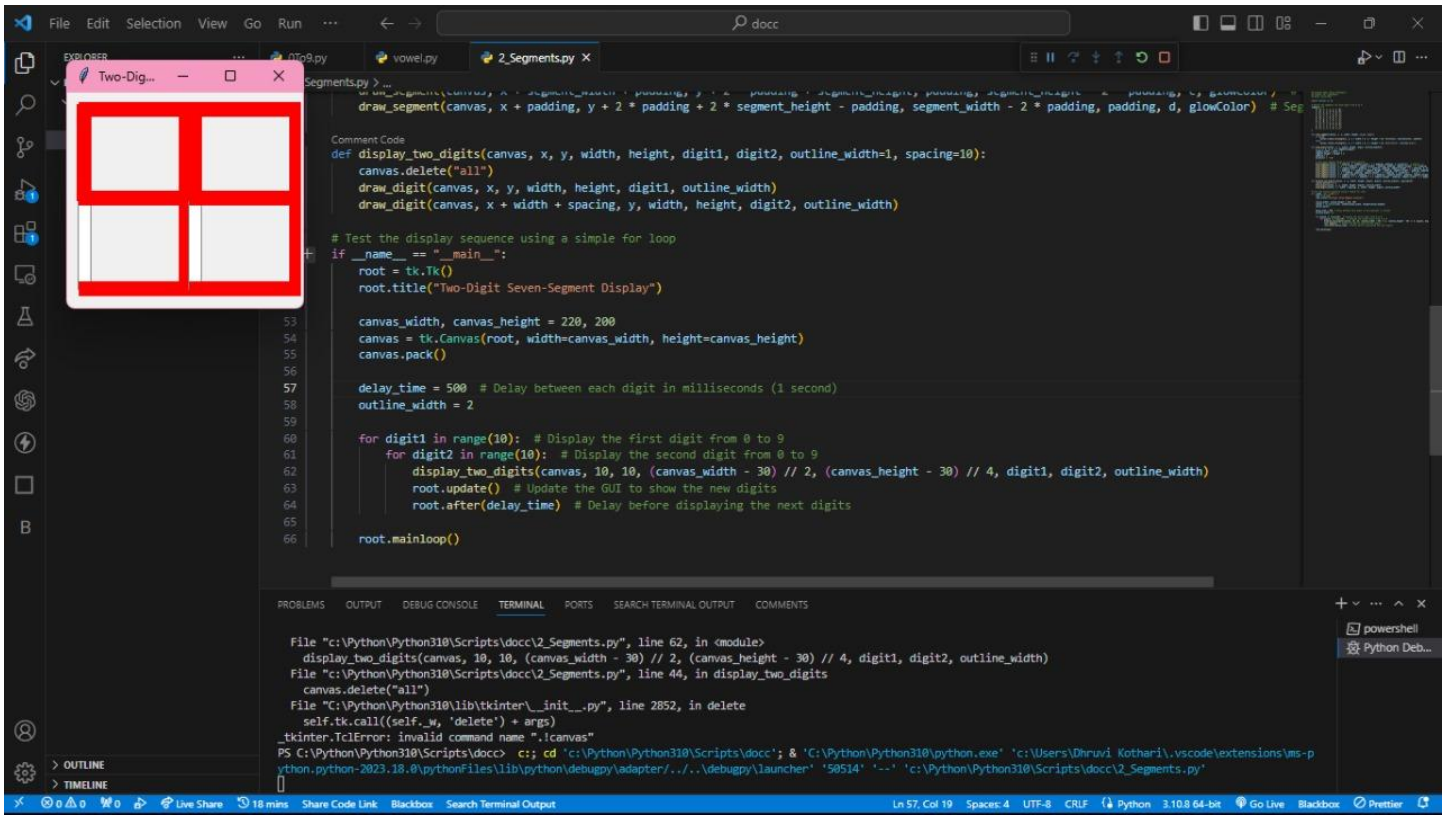

File Edit Selection View Go Run
docc
EXPLORER
0To9.py
vowel.py
2_Segments.py 1
vowel.py > ...
Student Name: Harsh Siddhapura
Student ID: 1230169813
Date: 10/14/2023
import tkinter as tk
# Define the segments for each vowel 'a', 'e', 'i', 'o', 'u'
vowel_segments = {
'a': [1, 1, 1, 1, 1, 1, 0],
'e': [1, 1, 0, 1, 1, 0, 1],
'i': [0, 0, 1, 0, 0, 1, 0],
'o': [1, 1, 1, 0, 1, 1, 1],
'u': [0, 1, 1, 0, 1, 1, 1]
}
Comment Code
def draw_segment(canvas, x, y, width, height, is_on, color):
if is_on:
canvas.create_rectangle(x, y, x + width, y + height, fill=color, outline=color, width=2)
else:
canvas.create_rectangle(x, y, x + width, y + height, fill="white", outline="gray")
Comment Code
def draw_vowel(canvas, x, y, width, height, vowel, outline_width=1):
segments = vowel_segments[vowel]
segment_width = width * 1
segment_height = height * 2
padding = 2
glow_color = "red"
PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS SEARCH TERMINAL OUTPUT COMMENTS
exec(code, run_globals)
File "c:\Python\Python310\Scripts\docc\vowel.py", line 42, in <module>
if _name_ == "main":
NameError: name '_name_' is not defined. Did you mean: '__name__'?
PS C:\Python\Python310\Scripts\docc> ^C
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50401' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50420' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
powershell
Python Deb...
OUTLINE
TIMELINE
Live Share 18 mins Share Code Link Blackbox Search Terminal Output
Ln 51, Col 22 Spaces: 4 UTF-8 CRLF Python 3.10.8 64-bit Go Live Blackbox Prettier


File Edit Selection View Go Run
docc
0To9.py
vowel.py
2_Segments.py 1
vowel.py > ...
Student Name: Harsh Siddhapura
Student ID: 1230169813
Date: 10/14/2023
import tkinter as tk
# Define the segments for each vowel 'a', 'e', 'i', 'o', 'u'
vowel_segments = {
'a': [1, 1, 1, 1, 1, 1, 0],
'e': [1, 1, 0, 1, 1, 0, 1],
'i': [0, 0, 1, 0, 0, 1, 0],
'o': [1, 1, 1, 0, 1, 1, 1],
'u': [0, 1, 1, 0, 1, 1, 1]
}
Comment Code
def draw_segment(canvas, x, y, width, height, is_on, color):
if is_on:
canvas.create_rectangle(x, y, x + width, y + height, fill=color, outline=color, width=2)
else:
canvas.create_rectangle(x, y, x + width, y + height, fill="white", outline="gray")
Comment Code
def draw_vowel(canvas, x, y, width, height, vowel, outline_width=1):
segments = vowel_segments[vowel]
segment_width = width * 1
segment_height = height * 2
padding = 2
glow_color = "red"
PROBLEMS 1 OUTPUT DEBUG CONSOLE TERMINAL PORTS SEARCH TERMINAL OUTPUT COMMENTS
powershell
Python Deb...
exec(code, run_globals)
File "c:\Python\Python310\Scripts\docc\vowel.py", line 42, in <module>
if _name_ == "main":
NameError: name '_name_' is not defined. Did you mean: '__name__'?
PS C:\Python\Python310\Scripts\docc> ^C
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50401' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50420' '--' 'c:\Python\Python310\Scripts\docc\vowel.py'
OUTLINE
TIMELINE
Live Share 18 mins Share Code Link Blackbox Search Terminal Output
Ln 51, Col 22 Spaces: 4 UTF-8 CRLF Python 3.10.8 64-bit Go Live Blackbox Prettier

2 Digit - 7 Segment Display






Two-Dig...
Comment Code
def display_two_digits(canvas, x, y, width, height, digit1, digit2, outline_width=1, spacing=10):
canvas.delete("all")
draw_digit(canvas, x, y, width, height, digit1, outline_width)
draw_digit(canvas, x + width + spacing, y, width, height, digit2, outline_width)
# Test the display sequence using a simple for loop
if __name__ == "__main__":
root = tk.Tk()
root.title("Two-Digit Seven-Segment Display")
canvas_width, canvas_height = 220, 200
canvas = tk.Canvas(root, width=canvas_width, height=canvas_height)
canvas.pack()
delay_time = 500 # Delay between each digit in milliseconds (1 second)
outline_width = 2
for digit1 in range(10): # Display the first digit from 0 to 9
for digit2 in range(10): # Display the second digit from 0 to 9
display_two_digits(canvas, 10, 10, (canvas_width - 30) // 2, (canvas_height - 30) // 4, digit1, digit2, outline_width)
root.update() # Update the GUI to show the new digits
root.after(delay_time) # Delay before displaying the next digits
root.mainloop()
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
SEARCH TERMINAL OUTPUT
COMMENTS
File "c:\Python\Python310\Scripts\docc\2_Segments.py", line 62, in <module>
display_two_digits(canvas, 10, 10, (canvas_width - 30) // 2, (canvas_height - 30) // 4, digit1, digit2, outline_width)
File "c:\Python\Python310\Scripts\docc\2_Segments.py", line 44, in display_two_digits
canvas.delete("all")
File "C:\Python\Python310\lib\tkinter__init__.py", line 2852, in delete
self.tk.call((self._w, 'delete') + args)
_tkinter.TclError: invalid command name ".!canvas"
PS C:\Python\Python310\Scripts\docc> c:; cd 'c:\Python\Python310\Scripts\docc'; & 'C:\Python\Python310\python.exe' 'c:\Users\Dhruvi Kothari\.vscode\extensions\ms-python.python-2023.18.0\pythonFiles\lib\python\debugpy\adapter/../..\debugpy\launcher' '50514' '--' 'c:\Python\Python310\Scripts\docc\2_Segments.py'
powershell
Python Deb...
OUTLINE
TIMELINE
Live Share
18 mins
Share Code Link
Blackbox
Search Terminal Output
Ln 57, Col 19
Spaces: 4
UTF-8
CRLF
Python
3.10.8 64-bit
Go Live
Blackbox
Prettier