2303A51285

BATCH-19

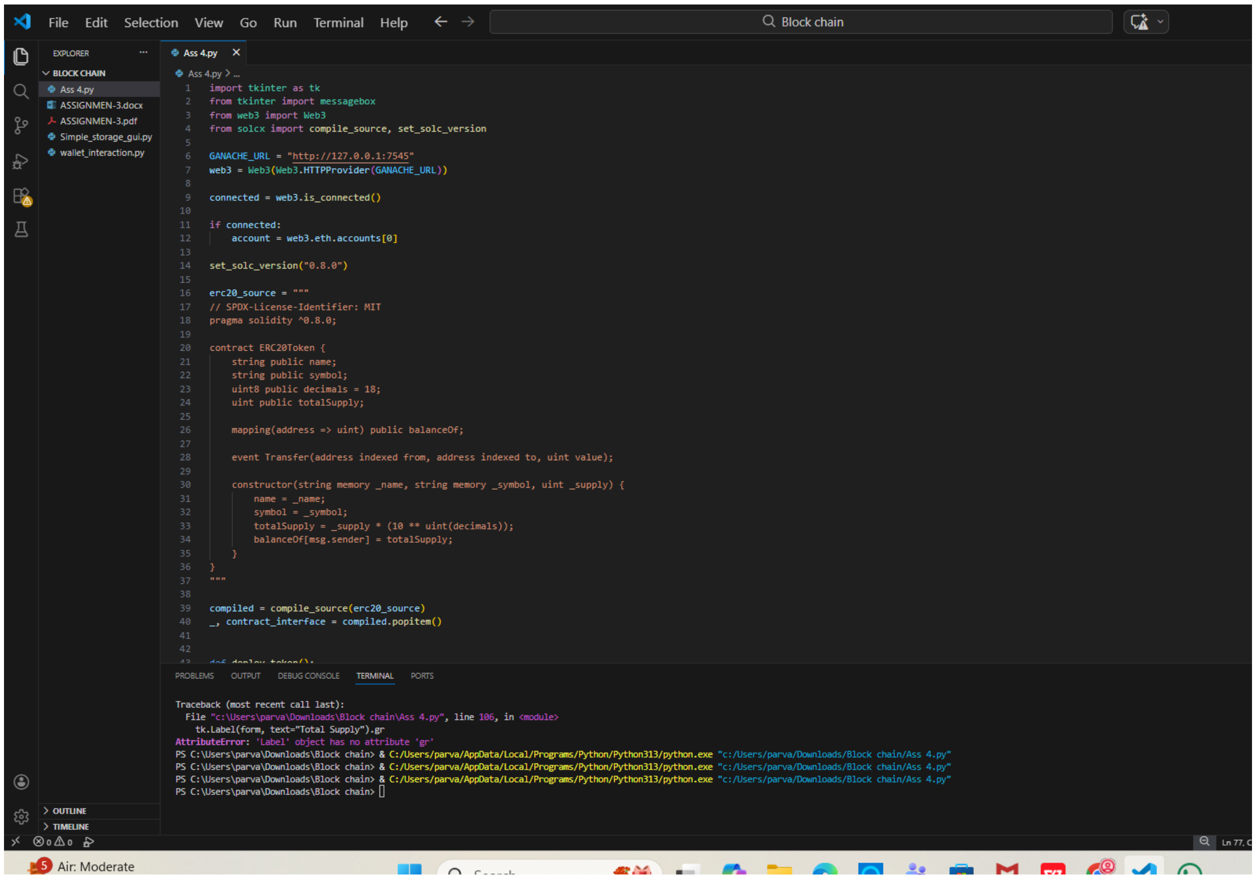
ASSIGNEMENT-04

PROBLEM:

Develop a basic ERC-20 token smart contract using Solidity that allows users to:

- Define token details such as name, symbol, decimals, and total supply
- Transfer tokens between Ethereum accounts
- Store and manage user token balances
- Emit events to record token transfer activities on the blockchain

This practical helps understand state variables, mappings, constructors, events, and functions in Solidity, as well as the basics of Ethereum token standards.



```python
import tkinter as tk
from tkinter import messagebox
from web3 import Web3
from solcx import compile_source, set_solc_version

GANACHE_URL = "http://127.0.0.1:7545"
web3 = Web3(Web3.HTTPProvider(GANACHE_URL))

connected = web3.is_connected()

if connected:
    account = web3.eth.accounts[0]

set_solc_version("0.8.0")

erc20_source = """
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract ERC20Token {
    string public name;
    string public symbol;
    uint8 public decimals = 18;
    uint public totalSupply;

    mapping(address => uint) public balanceOf;

    event Transfer(address indexed from, address indexed to, uint value);

    constructor(string memory _name, string memory _symbol, uint _supply) {
        name = _name;
        symbol = _symbol;
        totalSupply = _supply * (10 ** uint(decimals));
        balanceOf[msg.sender] = totalSupply;
    }
}
"""

compiled = compile_source(erc20_source)
_, contract_interface = compiled.popitem()
```

```
Traceback (most recent call last):
  File "c:\Users\parva\Downloads\Block chain\Ass 4.py", line 106, in <module>
    tk.Label(form, text="Total Supply").gr
AttributeError: 'Label' object has no attribute 'gr'
PS C:\Users\parva\Downloads\Block chain> & C:/Users/parva/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/parva/Downloads/Block chain/Ass 4.py"
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PS C:\Users\parva\Downloads\Block chain> 
```

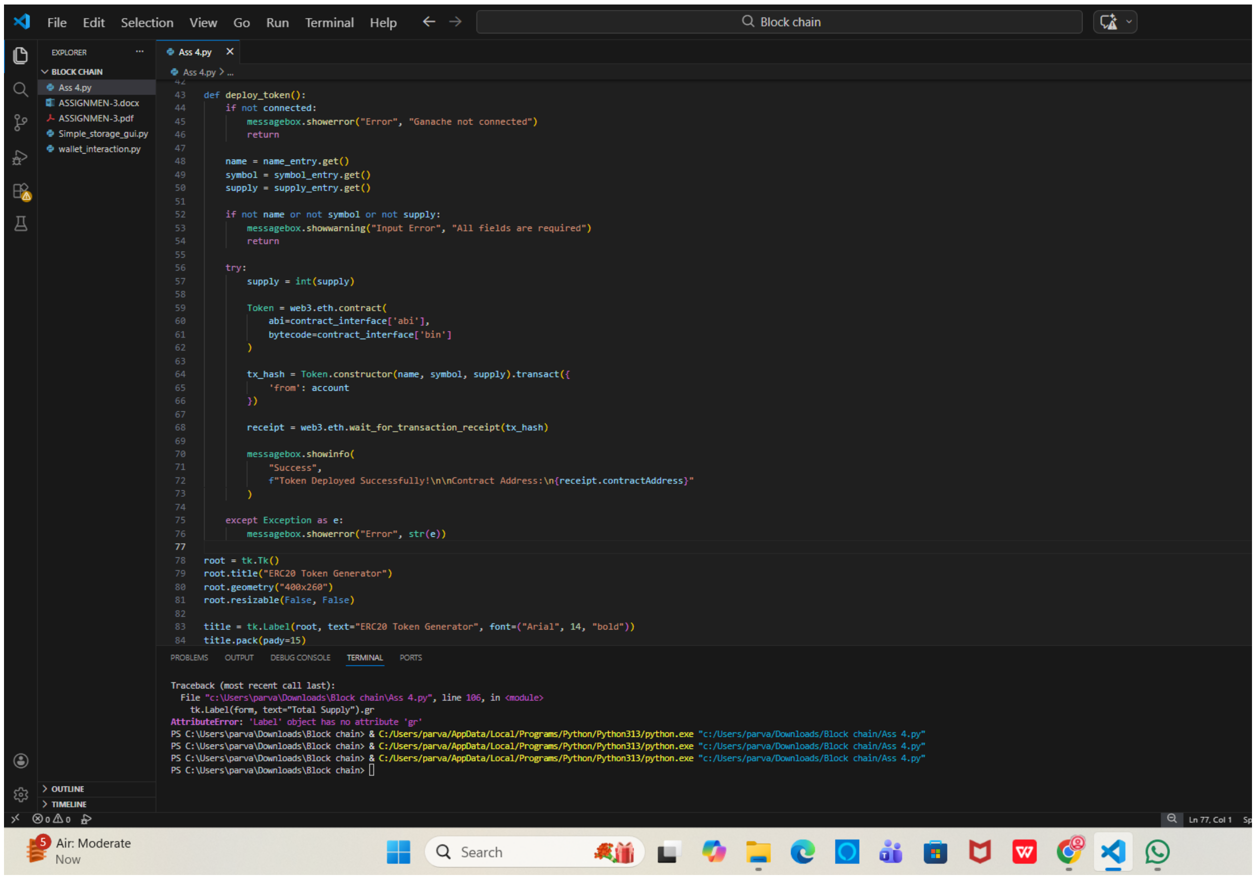

```python
def deploy_token():
    if not connected:
        messagebox.showerror("Error", "Ganache not connected")
        return

    name = name_entry.get()
    symbol = symbol_entry.get()
    supply = supply_entry.get()

    if not name or not symbol or not supply:
        messagebox.showwarning("Input Error", "All fields are required")
        return

    try:
        supply = int(supply)

        Token = web3.eth.contract(
            abi=contract_interface['abi'],
            bytecode=contract_interface['bin']
        )

        tx_hash = Token.constructor(name, symbol, supply).transact({
            'from': account
        })

        receipt = web3.eth.wait_for_transaction_receipt(tx_hash)

        messagebox.showinfo(
            "Success",
            f"Token Deployed Successfully!\n\nContract Address:\n{receipt.contractAddress}"
        )

    except Exception as e:
        messagebox.showerror("Error", str(e))

root = tk.Tk()
root.title("ERC20 Token Generator")
root.geometry("400x260")
root.resizable(False, False)

title = tk.Label(root, text="ERC20 Token Generator", font=("Arial", 14, "bold"))
title.pack(pady=15)
```

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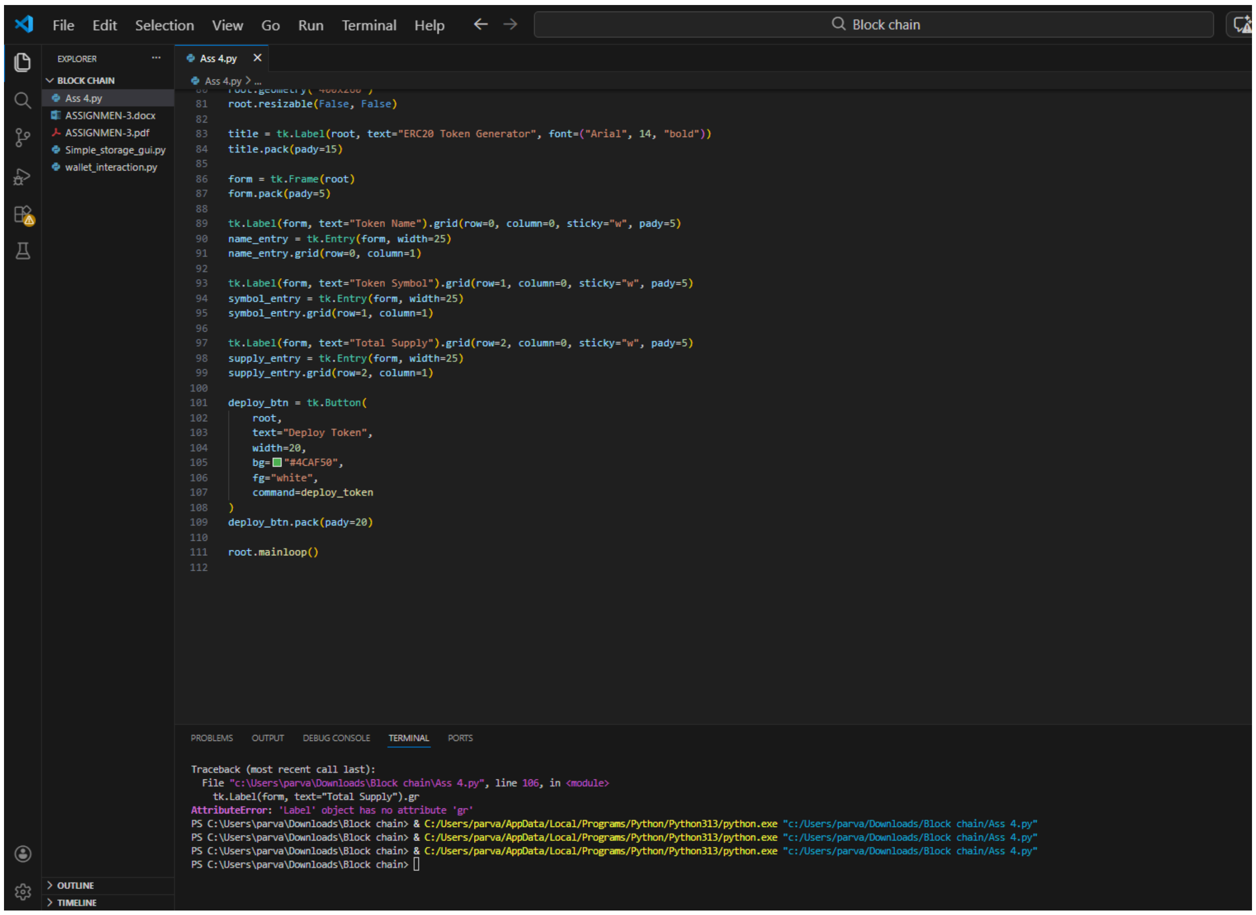

```python
root.resizable(False, False)

title = tk.Label(root, text="ERC20 Token Generator", font=("Arial", 14, "bold"))
title.pack(pady=15)

form = tk.Frame(root)
form.pack(pady=5)

tk.Label(form, text="Token Name").grid(row=0, column=0, sticky="w", pady=5)
name_entry = tk.Entry(form, width=25)
name_entry.grid(row=0, column=1)

tk.Label(form, text="Token Symbol").grid(row=1, column=0, sticky="w", pady=5)
symbol_entry = tk.Entry(form, width=25)
symbol_entry.grid(row=1, column=1)

tk.Label(form, text="Total Supply").grid(row=2, column=0, sticky="w", pady=5)
supply_entry = tk.Entry(form, width=25)
supply_entry.grid(row=2, column=1)

deploy_btn = tk.Button(
    root,
    text="Deploy Token",
    width=20,
    bg="#4CAF50",
    fg="white",
    command=deploy_token
)
deploy_btn.pack(pady=20)

root.mainloop()
```

```
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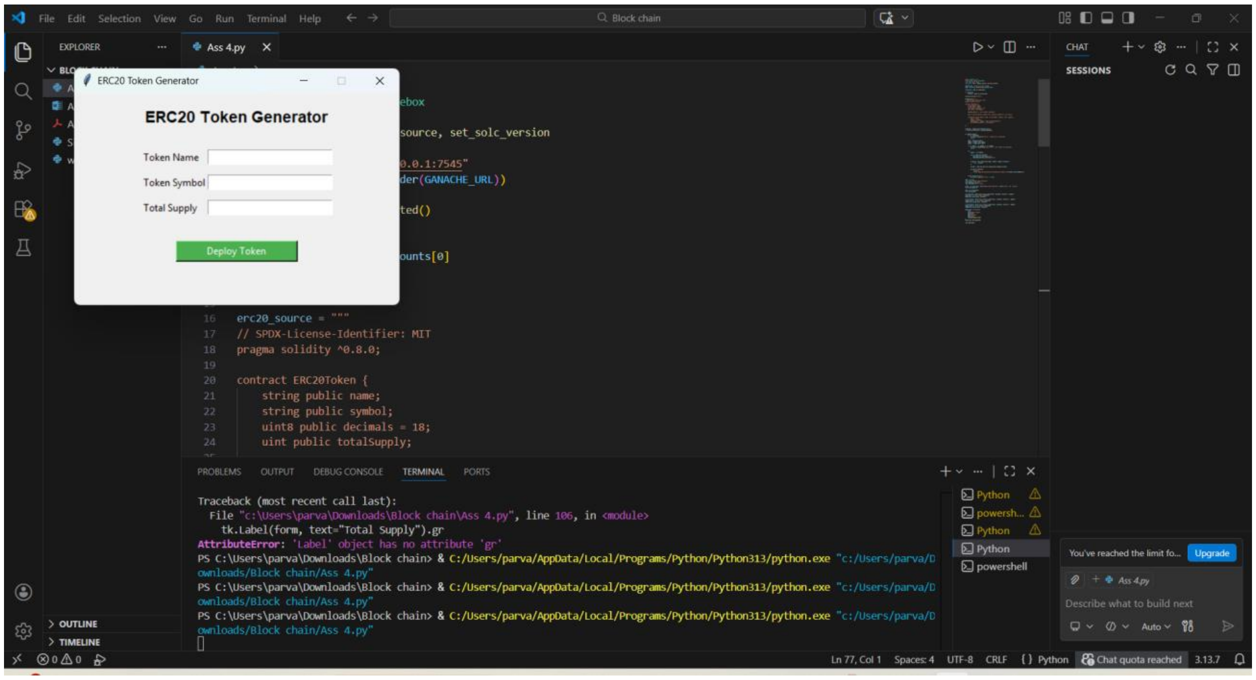

ERC20 Token Generator

Token Name

Token Symbol

Total Supply

Deploy Token

```
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```

Observation:

- **State variables** = name, symbol, decimals, totalSupply, balanceOf
- **Constructor** = constructor(uint initialSupply)
- **Token transfer function** = transfer(address to, uint value)
- **Balance storage** = mapping(address => uint) balanceOf
- **Event used** = Transfer(address from, address to, uint value)