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SECTION- BC(2)
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MINI PROJECT OF PYTHON

01)BASIC CLACULATOR

```
import re

def add(x, y):
    return x + y

def subtract(x, y):
    return x - y

def multiply(x, y):
    return x * y

def divide(x, y):
    if y == 0:
        return "Error! Division by zero is not allowed."
    else:
        return x / y

def calculator():
    print("Welcome to the calculator!")
    print("Select operation:")
    print("1. Add")
    print("2. Subtract")
    print("3. Multiply")
    print("4. Divide")

    choice = input("Enter choice (1/2/3/4): ")


    pattern = re.compile("^-?[0-9]+$")

    if choice in ['1', '2', '3', '4']:
        num1 = input("Enter first number: ")
        num2 = input("Enter second number: ")

        if pattern.match(num1) and pattern.match(num2):
            num1 = int(num1)
```

```
            num2 = int(num2)

            if choice == '1':
                print("Result:", add(num1, num2))
            elif choice == '2':
                print("Result:", subtract(num1, num2))
            elif choice == '3':
                print("Result:", multiply(num1, num2))
            elif choice == '4':
                print("Result:", divide(num1, num2))
        else:
            print("Invalid input! Please enter valid numbers.")
    else:
        print("Invalid input! Please enter a valid choice.")

calculator()
```

02) NUMBER SYSTEM

```
import random

def forward(num):
    return num + 1

def backward(num):
    return num - 1

def horizontal(num):
    return num * 2

def vertical(num):
    return num / 2

def generate_random_number():
    return random.randint(1, 100)

def number_system():
    current_number = generate_random_number()

    print("Welcome to the Number System!")
    print("You are currently at:", current_number)

    while True:
        print("\nChoose your movement:")
        print("1. Forward")
        print("2. Backward")
        print("3. Horizontal")
        print("4. Vertical")
        print("5. Quit")

        choice = input("Enter your choice (1/2/3/4/5): ")

        if choice == '1':
            current_number = forward(current_number)
        elif choice == '2':
```

```
            current_number = backward(current_number)
        elif choice == '3':
            current_number = horizontal(current_number)
        elif choice == '4':
            current_number = vertical(current_number)
        elif choice == '5':
            print("Exiting the Number System. Goodbye!")
            break
        else:
            print("Invalid choice! Please enter a valid option.")

        print("You are now at:", current_number)

number_system()
```

03) VOTING SYSTEM

```
import random

class Voter:
    def __init__(self, name, age):
        self.name = name
        self.age = age
        self.vote_cast = False

def generate_candidates(num_candidates):
    candidates = []
    for i in range(num_candidates):
        name = ''.join(random.choices('abcdefghijklmnopqrstuvwxyz',
k=random.randint(5, 10)))
        candidates.append(name)
    return candidates

def cast_vote(voter, candidates):
    if not voter.vote_cast:
        candidate = random.choice(candidates)
        print(f"{voter.name} votes for {candidate}.")
        voter.vote_cast = True
    else:
        print(f"{voter.name} has already cast a vote.")

def voting_system(num_voters, num_candidates):
    candidates = generate_candidates(num_candidates)
    print("Candidates:", candidates)
    voters = []

    print("\nVoting begins:")
    for i in range(num_voters):
        name = ''.join(random.choices('abcdefghijklmnopqrstuvwxyz',
k=random.randint(5, 10)))
        age = random.randint(16, 80)
        voters.append(Voter(name, age))

    for voter in voters:
        if voter.age >= 18:
```

```
            cast_vote(voter, candidates)
        else:
            print(f"{voter.name} is not eligible to vote due to age
({voter.age}).")

    print("\nVoting completed.")

voting_system(10, 5)
```

04) GRADING SYSTEM

```
import random

def grade_marks(marks):
    if marks >= 90:
        return "A"
    elif marks >= 80:
        return "B"
    elif marks >= 70:
        return "C"
    elif marks >= 60:
        return "D"
    elif marks >= 50:
        return "E"
    else:
        return "F"

def add_bonus(marks):
    bonus = random.randint(0, 10)
    return marks + bonus

def subtract_penalty(marks):
    penalty = random.randint(0, 5)
    return max(0, marks - penalty)

def marks_grading_system():
    student_name = input("Enter student's name: ")
    student_marks = float(input("Enter student's marks: "))

    student_marks = add_bonus(student_marks)
    student_marks = subtract_penalty(student_marks)

    grade = grade_marks(student_marks)

    print("\nStudent Name:", student_name)
    print("Original Marks:", student_marks)
    print("Grade:", grade)

marks_grading_system()
```

05) INVENTORY SYSTEM

```
import random
def hdn4wrd_purchase(item, price, amount):
    total_cost = price * amount
    return total_cost

def rv3rse_change(given, total_cost):
    return given - total_cost

def v3rt1c4l_count_notes(change):
    notes = [500, 200, 100, 50, 10, 5, 2, 1]
    notes_count = {}

    for note in notes:
        count = change // note
        if count > 0:
            notes_count[note] = count
            change %= note

    return notes_count

def inventory_system():
    inventory = {
        "item1": 10,
        "item2": 20,
        "item3": 15
    }

    while True:
        print("\nAvailable Items:")
        for item, quantity in inventory.items():
            print(f"{item}: {quantity}")

        item = input("\nEnter the item you want to purchase: ")
        if item not in inventory:
            print("Item not available! Please choose again.")
            continue

        price = random.randint(5, 100)
        amount = int(input(f"Enter the quantity of {item} you want to
buy: "))
        total_cost = hdn4wrd_purchase(item, price, amount)

        print(f"Total cost for {amount} {item}: {total_cost}")

        given = float(input("Enter the amount given: "))
        change = rv3rse_change(given, total_cost)

        if change < 0:
            print(f"You still need to pay {-change} more.")
        elif change == 0:
            print("Exact amount given. Thank you!")
        else:
            print(f"Change to be returned: {change}")
            notes_count = v3rt1c4l_count_notes(change)
            print("Number")
```

06) NUMBER GUESSING GAME

```
import random

def generate_number():
    return random.randint(1, 100)

def guess_number():
    print("Welcome to the Number Guessing Game!")
    print("I'm thinking of a number between 1 and 100.")

    secret_number = generate_number()
    attempts = 0

    while True:
        guess = input("Take a guess: ")

        if not guess.isdigit():
            print("Please enter a valid number.")
            continue

        guess = int(guess)
        attempts += 1

        if guess < secret_number:
            print("Too low! Try again.")
        elif guess > secret_number:
            print("Too high! Try again.")
        else:
            print(f"Congratulations! You guessed it right in {attempts}
attempts!")
            break

guess_number()
```

07) ROLL THE DICE

```
import random

def roll_dice(num_dice=1, num_sides=6):
    if num_dice <= 0 or num_sides <= 0:
        return "Invalid input! Number of dice and number of sides must be
positive integers."

    results = []
    for _ in range(num_dice):
        roll_result = random.randint(1, num_sides)
        results.append(roll_result)

    return results

def main():
    print("Welcome to Roll the Dice!")
    num_dice = int(input("Enter the number of dice to roll: "))
    num_sides = int(input("Enter the number of sides for each die: "))
```

```
    dice_results = roll_dice(num_dice, num_sides)
    print("Results:", dice_results)

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

08) ROCK PAPER SCISSOR

```
import random

def computer_choice():
    choices = ['rock', 'paper', 'scissors']
    return random.choice(choices)

def player_choice():
    choice = input("Enter your choice (rock/paper/scissors): ").lower()
    if choice in ['rock', 'paper', 'scissors']:
        return choice
    else:
        print("Invalid choice! Please enter 'rock', 'paper', or
'scissors'.")
        return player_choice()

def determine_winner(player, computer):
    if player == computer:
        return "It's a tie!"
    elif (player == 'rock' and computer == 'scissors') or (player ==
'paper' and computer == 'rock') or (player == 'scissors' and computer ==
'paper'):
        return "You win!"
    else:
        return "Computer wins!"

def play_game():
    print("Let's play Rock, Paper, Scissors!")
    player = player_choice()
    computer = computer_choice()
    print("You chose:", player)
    print("Computer chose:", computer)
    print(determine_winner(player, computer))

play_game()
```