EXPERIMENT NO. - 05

AIM: Edit/compile/run a program to read a four digit number through the keyboard and calculate the sum of its digit.

THEORY:

Introduction to Sum of Digits of a Number

The goal is to determine the **sum of digits** of a number given as an input in Python. **Example:**

Input:

```
n = 54
```

Output:

```
9
```

Input:

```
n = 121
```

Output:

```
4
```

We begin by dividing the number into digits and then adding all of the digits to the sum variable. To break down the string, we use the following operators:

The modulo operator % is used to extract the digits from a number. After removing the digit, we apply the divide operator to shorten the number.

Different Methods to Find Sum of Digits of a Number in Python

Using str() and int() methods

To convert a number to a string, use the str() function. To convert a string digit to an integer, use the int() function.

Convert the number to a string, iterate over each digit in the string, and add to the sum of the digits in each iteration.

Algorithm Flow:

- Step 1: Gather user input.
- Step 2: Create a variable to hold the result.
- Step 3: Convert the number to a string.
- Step 4: Write a loop for each digit in a number.
- Step 5: Convert the digit to an integer and add it to the sum.
- Step 6: Invoke the function and print the result.

Program A:

```
# Function to get sum of digits
def getSum(n):

    sum = 0
    for digit in str(n):
      sum += int(digit)
    return sum

n = 569
print(getSum(n))
```

Output:

```
20
```

Using iteration

We shall use loops to calculate the sum of digits of a number. Loops are used to execute a specific piece of code continually. Some looping statements are for loop, while, and do-while.

To find the rightmost digit of an integer, divide the integer by 10 until it equals 0. Finally, the remaining will be the rightmost digit. Use the remaining operator " percent " to receive the reminder. Divide the obtained quotient by 10 to get all the digits of a number. To find the number's quotient, we use “//”.

Algorithm Flow:

- Step 1: Create a function for finding the sum using the parameter n.
- Step 2: Declare a variable sum to store the digit sum.
- Step 3: Create a loop that will run until n is greater than zero.
- Step 4: To the remainder returned by, add the sum variable (n percent 10)
- Step 5: Change n to n/10.
- Step 6: Collect feedback from the user.
- Step 7: Invoke the function defined earlier and pass the input as an argument.
- Step 8: Print the sum of the values returned by the function.

Program B:

```
# Function to get the sum of digits
def getSum(n):

    sum = 0
    while (n != 0):

        sum = sum + (n % 10)
        n = n//10

    return sum

n = 569
print(getSum(n))
```

Output:

```
20
```

Using Recursion

Recursion is the process of defining a problem or the solution to a problem in terms of a simpler version of itself. The corresponding function is called the recursive function. The use of recursion eliminates the requirement for loops in the programming.

Follow the algorithm for a thorough description of how the software works.

Algorithm Flow:

- Step 1: Create a function for finding the sum of digits with the parameter n to compute the sum.
- Step 2: Determine whether n is less than 10; return n.
- Step 3: If not, divide the number by 10 and find the residual (n percent 10)
- Step 4: Recursively call the function and pass (n/10) as a parameter.
- Step 5: Add the remainder and the value returned by the function.
- Step 6: Collect user input.
- Step 7: Invoke the sum of digits function for finding the sum of digits of a number, passing input as a parameter.

Program C:

```
# sum of digits in number.

def sumDigits(no):
    return 0 if no == 0 else int(no % 10) + sumDigits(int(no / 10))

# Driver code
n = 569
print(sumDigits(n))
```

Output:

```
20
```

Using Sum() method

The sum() method is used to compute the sum of digits of a number in python in a list.

Convert the number to a string using str(), then strip the string and convert it to a list of numbers with the strip() and map() methods, respectively. Then, compute the total using the sum() method.

Algorithm Flow:

- Step 1: Create a function for finding the sum of digits with the parameter n to compute the sum.
- Step 2: The number is converted to a string via the str() method.
- Step 3: Then, the string is striped and converted to list digits of the given number via strip() and map() method, respectively.
- Step 4: The sum() method is invoked to compute the total sum of digits.

Program D:

```
# Function to get sum of digits
```

```
def getSum(n):

    strr = str(n)
    list_of_number = list(map(int, strr.strip()))
    return sum(list_of_number)

n = 569
print(getSum(n))
```

Output:

```
20
```

Conclusion

- A sum of digits of a number in python in a given number base is the sum of all its digits. For example, the digit sum of the decimal number 9045 would be 9+0+4+5=18.
- sum of digits of a number in Python can be calculated in many ways, such as using inbuilt functions, iteration, and recursion, as discussed earlier.

Conclusion: Hence, we have successfully studied about initializing the program to read a four digit number through the keyboard and calculate the sum of its digit.