

# Assignment – 5.2

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Q1) Write a Python function fibonacci(n) that returns the nth Fibonacci number using recursion.

Test the function with different values of n.

Sol:

```
def fibonacci(n):
```

```
    if n <= 1:
```

```
        return n
```

```
    return fibonacci(n - 1) + fibonacci(n - 2)
```

```
print(fibonacci(0))
```

```
print(fibonacci(1))
```

```
print(fibonacci(2))
```

```
print(fibonacci(5))
```

```
print(fibonacci(10))
```

```
print(fibonacci(15))
```

Output:

```
0
1
1
5
55
610
```

Q2) Write a lambda function that takes two numbers as input and returns their sum.

Sol:

```
sum_lambda = lambda x, y: x + y
print(sum_lambda(3, 5))
print(sum_lambda(10, 20))
```

Output:

```
8
30
```

Q3) Write a Python program that demonstrates the difference between a local and a global variable. Declare a global variable `x = 10`, then modify it locally inside a function and print the results before and after the function call.

Sol:

```
x = 10
```

```
def modify_variable():
```

```
    global x
```

```
    x = 20
```

```
    print("Inside function, x =", x)
```

```
print("Before function call, x =", x)
```

```
modify_variable()
```

```
print("After function call, x =", x)
```

Output:

```
Before function call, x = 10
Inside function, x = 20
After function call, x = 20
```

Q4) Write a Python program to create a simple calculator that can add, subtract, multiply, and divide using functions. Each operation should be a separate function.

Sol:

```
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 "Cannot divide by zero"
```

```
    return x / y
```

```
print("Select operation:")
```

```
print("1. Add")
```

```
print("2. Subtract")
```

```
print("3. Multiply")
```

```
print("4. Divide")
```

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

```
num1 = float(input("Enter first number: "))
```

```
num2 = float(input("Enter second number: "))
```

```
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")
```

Output:

```
Select operation:  
1. Add  
2. Subtract  
3. Multiply  
4. Divide  
Enter choice (1/2/3/4): 3  
Enter first number: 20  
Enter second number: 4  
Result: 80.0  
PS D:\VS CODE(python)> & C:/Use  
Select operation:  
1. Add  
2. Subtract  
3. Multiply  
4. Divide  
Enter choice (1/2/3/4): 4  
Enter first number: 23  
Enter second number: 45  
Result: 0.5111111111111111
```

Q5) Write a function `is_prime(n)` that checks if a number is prime. Use this function inside a program to check if a given number is prime or not.

Sol:

```
def is_prime(n):
```

```
    if n <= 1:
```

```
        return False
```

```
    for i in range(2, int(n ** 0.5) + 1):
```

```
        if n % i == 0:
```

```
            return False
```

```
    return True
```

```
number = int(input("Enter a number to check if it's prime: "))
```

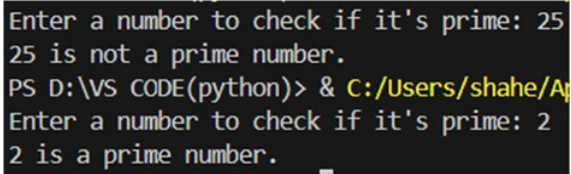
```
if is_prime(number):
```

```
    print(f"{number} is a prime number.")
```

```
else:
```

```
    print(f"{number} is not a prime number.")
```

Output:



```
Enter a number to check if it's prime: 25
25 is not a prime number.
PS D:\VS CODE(python)> & C:/Users/shahe/AppData/Local/Programs/Python/Python39-64/Python.exe
Enter a number to check if it's prime: 2
2 is a prime number.
```

Q6) Write a function `is_palindrome(s)` that checks if a given string `s` is a palindrome (reads the same forward and backward). Use this function inside a program to check different strings.

Sol:

```
def is_palindrome(s):
```

```
    s = s.lower().replace(" ", "")
```

```
    return s == s[::-1]
```

```
string = input("Enter a string to check if it's a palindrome: ")
```

```
if is_palindrome(string):
```

```
    print(f"'{string}' is a palindrome.")
```

```
else:
```

```
    print(f"'{string}' is not a palindrome.")
```

Output:

```
Enter a string to check if it's a palindrome: nitin
'nitin' is a palindrome.
PS D:\VS CODE(python)> & C:/Users/shahe/AppData/Local/Programs/Python/Python39-64/python.exe
Enter a string to check if it's a palindrome: car
'car' is not a palindrome.
```

Q7) Write a Python function find\_largest(lst) that takes a list of numbers as input and returns the largest number.

Sol:

```
def find_largest(lst):
```

```
    if not lst:
```

```
        return None
```

```
    largest = lst[0]
```

```
    for num in lst:
```

```
        if num > largest:
```

```
            largest = num
```

```
    return largest
```

```
numbers = [3, 5, 9, 1, 6]
```

```
print("The largest number is:", find_largest(numbers))
```

Output:

```
The largest number is: 9
```

Q8) Write a function `celsius_to_fahrenheit(celsius)` that converts Celsius to Fahrenheit and another function `fahrenheit_to_celsius(fahrenheit)` that converts Fahrenheit to Celsius. Use these functions in a program to perform the conversions.

Sol:

```
def celsius_to_fahrenheit(celsius):
```

```
    return celsius*(9/5) + 32
```

```
def fahrenheit_to_celsius(fahrenheit):
```

```
    return (fahrenheit-32)*(5/9)
```

```
cel = int(input("Enter temperature in Celsius: "))
```

```
fah = int(input("Enter temperature in Fahrenheit: "))
```

```
print(f"'{cel}' in fahrenheit is '{celsius_to_fahrenheit(cel)}'")
```

```
print(f"'{fah}' in fahrenheit is '{fahrenheit_to_celsius(fah)}'")
```

Output:

```
Enter temperature in Celsius: 27
Enter temperature in Fahrenheit: 100
'27' in fahrenheit is '80.6'
'100' in fahrenheit is '37.77777777777778'
```



Q9: Write a function `count_words(sentence)` that takes a sentence as input and returns the number of words in it.

Sol:

```
def count_words(sentence):
```

```
    words = sentence.split()
```

```
    return len(words)
```

```
sentence = "This is a sample sentence."
```

```
print("Number of words:", count_words(sentence))
```

Output:

```
Number of words: 5
```

Q10) Write a function `validate_password(password)` that checks if a password meets the following criteria:

- At least 8 characters long
  - Contains both uppercase and lowercase characters
  - Contains at least one number
- Use this function inside a program to validate user-entered passwords.

Sol: