

1a) Write a Python program to find the best of two test averages out of three tests marks accepted from the user.

```
def get_valid_test_score():
    while True:
        try:
            score = float(input("Enter a test score: "))
            if 0 <= score <= 100:
                return score
        except:
            print("Please enter a valid test score between 0 and 100.")
    except ValueError:
        print("Invalid input. Please enter a valid number.")

test_scores = []
for i in range(3):
    test_scores.append(get_valid_test_score())
test_scores.sort(reverse=True)
best_two_averages = sum(test_scores[:2]) / 2
print(f"The average of the best two test scores is: {best_two_averages:.2f}")
```

Output:

```
Enter a test score: 25
Enter a test score: 15
Enter a test score: 25
The average of the best two test scores is: 25.00
```

1 b) Develop a Python Program to check whether a given number is a palindrome or not and also count the number of occurrences of each digit In the input number

```
def is_palindrome(number):
    number_str = str(number)
    return number_str == number_str[::-1]

def count_digits(number):
    digit_count = [0] * 10 # Initialize a list to count each digit from 0 to 9
    while number > 0:
        digit = number % 10 # Get the last digit
        digit_count[digit] += 1 # Increment the count for that digit
        number //= 10 # Remove the last digit
    return digit_count

try:
    num = int(input("Enter a number: "))
    if num < 0:
        print("Please enter a non-negative number.")
    else:
        if is_palindrome(num):
            print(f"{num} is a palindrome.")
        else:
            print(f"{num} is not a palindrome.")
        digit_count = count_digits(num)
        for digit, count in enumerate(digit_count):
            if count > 0:
                print(f"Digit {digit} appears {count} times in the number.")
except ValueError:
    print("Invalid input. Please enter a valid integer.")
```

Output:

```
Enter a number: 121
121 is a palindrome.
Digit 1 appears 2 times in the number.
Digit 2 appears 1 times in the number.
```

2a. Defined as a function F as $F_n = F_{n-1} + F_{n-2}$. Write a Python program which accepts a value for N (where $N > 0$) as input and pass this value to the function. Display suitable error message if the condition for input value is not followed.

```
def fn(n):  
    if n == 1:  
        return 0  
    elif n == 2:  
        return 1  
    else:  
        return fn(n-1) + fn(n-2)  
num = int(input("Enter a number : "))  
if num > 0:  
    print("fn(", num, ") = ",fn(num) , sep = "")  
else:  
    print("Error in input")
```

Output:

```
Enter a number : 5  
fn(5) = 3  
Enter a number : -5  
Error in input
```

2b. Develop a python program to convert binary to decimal, octal to hexadecimal using functions.

```
def BinToDec(x):  
    dec = 0  
    i = 0  
    while x>0:  
        r = x%10  
        if r!=0 and r!=1:  
            print("Enter a valid Binary number")  
            return 0  
        else:  
            dec = dec + r*2**i  
            x = x // 10  
            i += 1  
    return dec  
  
def OctaToHexa(n):  
    num = n  
    dec = 0  
    base = 1  
    temp = num  
    while temp:  
        r = temp % 10  
        temp = temp // 10  
        dec += r * base  
        base = base * 8  
    result = ''  
    while dec != 0:  
        temp = 0
```

```
temp = dec % 16
if temp < 10:
    result = str(temp) + result
else:
    result = chr(temp +55) + result
dec = dec // 16
return result
```

```
x = int(input("Enter a Binary number "))
result = BinToDec(x)
if result:
    print("The Decimal equivalent of {0} is {1}".format(x, result))
y = int(input("Enter a Octal number "))
result = OctaToHexa(y)
print(result)
if result:
    print("The Hexa Decimal equivalent of {0} is {1}".format(y, result))
```

Output:

Enter a Binary number 1010

The Decimal equivalent of 1010 is 10

Enter a Octal number 147

67

The Hexa Decimal equivalent of 147 is 67