DELHI PUBLIC SCHOOL BANGALORE NORTH

2023-2024

COMPUTER SCIENCE

(083)

PRACTICAL RECORD FILE

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CLASS/ SEC	**XI - A**

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Computational Thinking and Programming – I
(PYTHON)

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23)	Write a program that accepts a string. Count and print the following present in the given string No. of Characters No. of Spaces No. of Letters (Alphabet) No. of Digits No. of Upper-Case Letters No. of Lower-Case Letters No. of Special Characters No. of Words		
24)	Write a menu driven program that implements nested loop to print any pattern based on user's choice (Any Three)		

Program 1:

WAP to compute x^n of given two integers x and n.

SOURCE CODE:

```
#Accepting Values
x=int(input("Enter Value for x :"))
n=int(input("Enter Value for n : "))
r=x**n #Computing x raised to n
print(x,"**",n ,"is",r) #Output statement
```

OUTPUT:

```
Enter Value for x :12
Enter Value for n : 4
12 ** 4 is 20736
```

Program 2:

WAP for calculating simple interest

Source Code:

```
p = int(input("enter principle amount: "))
r = int(input("enter rate of interest: "))
t = int(input("enter time: "))
si = (p*r*t)/100
print("simple interest: ", si)
```

Output:

```
enter principle amount: 4000
enter rate of interest: 12
enter time: 4
simple interest:  1920.0
```

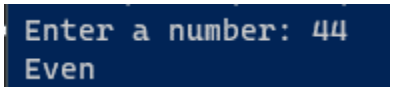
Program 3:

WAP to accept a number from the user and display whether it is an even number or Odd number.:

Source Code:

```
#check odd or evn
num = int(input("Enter a number: "))
print("Even") if num%2==0 else print("Odd") #if the numbber leaves zero as remaider when divided by two it is even
```

Output:



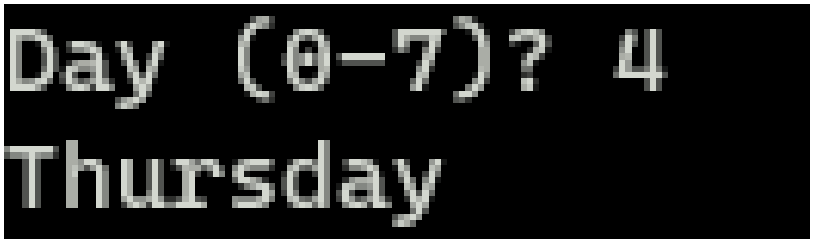
Program 4:

WAP to accept the day of the week from the user and print the day of the week in words

Source Code:

```
days = ["Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday", "Sunday"] #list of days of week in order
day = int(input("Day (0-7)? ")) #ask user for day of week
print(days[day-1]) #print day of week
```

Output:



Program5:

WAP to check whether the given year is leap year or not.

Source code:

```
#check if leap year or not
year = int(input("Enter a year: "))
if year%4==0:#if the year is divisible by 4 then it is a leap year
    if year%100==0: #if the year is divisible by 100 then it is not a leap year
        if year%400==0: #if the year is divisible by 400 then it is a leap year
            print("Leap year")
        else:
            print("Not a leap year")
    else:
        print("Leap year")
```

Output:

```
Enter a year: 1600
Leap year
```

Program 6:

WAP to take accept two numbers and operator from the user and create a menu to provide four functions of a calculator (+,- ,* , /)

Source code:

```
#create calculator using if else
n1, n2 = input("Enter two numbers: ").split()
n1, n2 = int(n1), int(n2)
print("1. Addition\n2. Subtraction\n3. Multiplication\n4. Division\n5. Modulus\n6. Exponentiation\n7. Floor division") #me
choice = int(input("Enter your choice: ")) #input choice
if choice==1: #if choice is 1 then add
    print("Addition is: ",n1+n2)
elif choice==2: #if choice is 2 then subtract
    print("Subtraction is: ",n1-n2)
elif choice==3: #if choice is 3 then multiply
    print("Multiplication is: ",n1*n2)
elif choice==4: #if choice is 4 then divide
    print("Division is: ",n1/n2)
elif choice==5: #if choice is 5 then modulus
    print("Modulus is: ",n1%n2)
elif choice==6: #if choice is 6 then exponentiation
    print("Exponentiation is: ",n1**n2)
elif choice==7: #if choice is 7 then floor division
    print("Floor division is: ",n1//n2)
else: #if choice is not in the range of 1 to 7 then invalid choice
    print("Invalid choice")
```

Output:

```
Enter two numbers: 12 13
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Modulus
6. Exponentiation
7. Floor division
Enter your choice: 3
Multiplication is:  156
```

Program 7:

WAP to accept a character from the user and check whether it is a letter, digit, space, or a special character.

Source Code:

```
#check if letter digit space or special character
char = input("Enter a character: ")
if char.isalpha(): #if the character is a letter
    print("Letter")
elif char.isdigit(): #if the character is a digit
    print("Digit")
elif char.isspace(): #if the character is a space
    print("Space")
else: #if the character is a special character
    print("Special character")
```

Output:

```
Enter a character:
Space
```

```
Enter a character: r
Letter
```

```
Enter a character: '
Special character
```

Program 8:

WAP to accept two numbers from the user and display the largest and the smallest number (using relational operators)

Source Code:

```
#print greatest and smallest number
num1, num2 = int(input("Enter a number: ")), int(input("Enter another number: "))
print("Greatest number is: ",num1) if num1>num2 else print("Greatest number is: ",num2)
```

Output:

```
Enter a number: 1223
Enter another number: 12
Greatest number is:  1223
```

Program 9

WAP to accept percentage of a student and display corresponding grade based on the criteria specified in the table given below:

Percentage	Grade
>=90	A
Between 80 and 89	B
Between 70 and 79	C
Between 60 and 69	D
Between 50 and 59	E
<50	F

Source Code:

```
#quetion 9: program to accpet percentage from user and print grade accordingly
perc = int(input("enter percentage: "))

if perc >= 90:
    print("Grade: A")

elif perc >= 80:
    print("Grade: B")
elif perc >= 70:
    print("Grade: C")
elif perc >= 60:
    print("Grade: D")
elif perc >= 40:
    print("Grade: E")
else:
    print("Grade: F")
```

Output:

```
enter percentage: 90
Grade: A
```

Program 10:

WAP to find the sum and product of first N natural number

Source code:

```
num = int(input("enter a number: "))
sum = 0
product = 1
for i in range(0, num):
    sum += i
    product = product*i
print(sum, product)
```

Output:

```
enter a number: 20
210 2432902008176640000
```

Program 11:

WAP to find and display the sum of first N even and odd numbers

Source code:

```
#sum and product of first n odd and even numbers
n = int(input("Enter a number: ")) #input number
sum_even = 0 #sum of even numbers
sum_odd = 0 #sum of odd numbers
product_even = 1 #product of even numbers
product_odd = 1 #product of odd numbers
for i in range(1,n+1): #loop from 1 to n
    if i%2==0: #if i is even
        sum_even+=i #add i to sum_even
        product_even*=i #multiply i to product_even
    else: #if i is odd
        sum_odd+=i #add i to sum_odd
        product_odd*=i #multiply i to product_odd
print("Sum of first",n,"even numbers is: ",sum_even)
print("Sum of first",n,"odd numbers is: ",sum_odd)
print("Product of first",n,"even numbers is: ",product_even)
print("Product of first",n,"odd numbers is: ",product_odd)
```

Output:

```
Enter a number: 14
Sum of first 14 even numbers is:  56
Sum of first 14 odd numbers is:  49
Product of first 14 even numbers is:  645120
Product of first 14 odd numbers is:  135135
```

Program 12:

WAP to print all the factors of a given number.

Source code:

```
#factors of a number
num = int(input("Enter a number: ")) #input number
print("Factors of",num,"are: ") #print factors of the number
for i in range(1,(num+1)): #loop from 1 to num
    if num%i==0: #if i is a factor of num
        print(i) #print i
```

Output:

```
Enter a number: 20
Factors of 20 are:
1
2
4
5
10
20
```

Program 13:

WAP to print all the numbers in the given range divisible by a given number

Num

Source code:

```
#o print all the numbers in the given range divisible by a given number
num = int(input("enter the range : ")) #range of numbers
div = int(input("enter a number to divide by: ")) #number to divide by
for i in range(0, num): #loop from 0 to num
    if i%div ==0: #if i is divisible by div
        print(i) #print i

```

Output

```
enter the range : 121
enter a number to divide by: 5
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
```

:

Program 14:

WAP to print the series 1,3,5,7,9….N

Source Code:

```
#print odd number series
print("Odd number series: ")
for i in range(1,101): #loop from 1 to 100
    if i%2!=0: #if i is odd
        print(i)
```

Output:

```
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47
49
```

Program 15:

WAP to count the number of negative numbers, positive numbers, odd and even numbers from a list of numbers entered by the user. The list terminates when the user enters a zero.

Source code:

```
#count the number of negative positive and zero numbers from an input list
pos = 0
neg = 0
odd = 0
even = 0
while True:
    num = int(input("enter a number: "))
    if num == 0:
        break
    if num > 0:
        pos += 1
    else:
        neg += 1
    if num%2 == 0:
        even += 1
    else:
        odd += 1
print("Number of even numbers: ",even)
print("Number of odd numbers: ",odd)
print("Number of positive numbers: ",pos)
print("Number of negative numbers: ",neg)
```

Output:

```
enter a number: 3
enter a number: 4
enter a number: 5
enter a number: -6
enter a number: -7
enter a number: 10
enter a number: 45
enter a number: 0
Number of even numbers:  3
Number of odd numbers:  4
Number of positive numbers:  5
Number of negative numbers:  2
```

Program 16:

WAP to accept a number from the user and check if it is a palindrome or not.

Source code:

```
n = int(input("enter a number: "))
num = n
palindrome = 0

while num > 0:
    rem = num%10
    palindrome = palindrome*10 + rem
    num //= 10
if n == palindrome:
    print(n, "is a palindrome")
else:
    print(n, "is not a palindrome")
```

Output:

```
enter a number: 121
121 is a palindrome
```

```
enter a number: 2224
2224 is not a palindrome
```

Program 17:

WAP to print Fibonacci series up to a certain limit

Source code:

```
def fibonacci(n):
    f = [0, 1] #list of first two fibonacci numbers
    for i in range(2, n+1): #for loop to iterate through the list from 2 to n+1 (n+1 because range is exclusive)
        f.append(f[i-1] + f[i-2]) #new val of the list is the sum of the previous two values in the list before f[i]
    return f[n],f #return the nth value of the list
num = int(input("enter a number: "))
print("The fibonacci series of numbers till", num, "is", fibonacci(num))
```

Output:

```
enter a number: 15
The fibonacci series of numbers till 15 is (610, [0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610])
```

Program 18:

WAP to display prime numbers up to a certain limit.

Source code:

```
# #finding prime numbers in a range
lower = 900
upper = 1000

print("Prime numbers between", lower, "and", upper, "are:")

for num in range(lower, upper + 1):
   # all prime numbers are greater than 1
   if num > 1:
       for i in range(2, num):
           if (num % i) == 0:
               break
       else:
           print(num)
```

Output:

```
Prime numbers between 900 and 1000 are:
907
911
919
929
937
941
947
953
967
971
977
983
991
997
```

Program 19:

WAP to accept a number, find and display whether it's an Armstrong number or not.

Source code:

```
n = int(input("enter a number: "))
temp = n
sum = 0

while n > 0: #while n is greater than 0
    rem = n%10 #remainder of n/10
    sum += rem**3 #sum is sum + rem^3
    n //= 10 #n is n/10
if temp == sum:     #if temp is equal to sum
    print(temp, "is an armstrong number")
else:
    print(temp, "is not an armstrong number")
```

Output:

```
enter a number: 153
153 is an armstrong number
```

```
enter a number: 22
22 is not an armstrong number
```

Program 20:

WAP to print the sum of the series

1+x1/1!+x2/2!+…….xn/n! [Exponential series]

Source code:

```
import math

x = int(input("enter  number x: ")) #x is the number
n = int(input("enter  number n: ")) #n is the number of terms
def exp(x,n): #function to calculate the exponential series
    series = 1 #first term of the series is 1
    for i in range(1,n+1): #loop from 1 to n+1 (n+1 because range is exclusive)
        series += x**i/math.factorial(i) #series is the sum of the previous term and the next term
    return series #return the series
print(exp(x,n)) #print the series
```

Output:

```
enter  number x: 4
enter  number n: 7
51.8063492063492
```

Program 21:

WAP to accept a string and display whether it is a palindrome.

Source code:

```
def palindrome(s): #function to check string is palindrome or not
    rev = ''.join(reversed(s))   #reversed() function returns the reversed iterator of the given string
    if (s == rev): #checking if the string is equal to its reverse
        return True #return true if it is palindrome
    return False #return false if it is not palindrome

s = str(input("Enter a string: ")) #input string
ans = palindrome(s) #calling the function

if (ans): #if ans is true
    print("Yes") #print yes
else: #else
    print("No") #print no
```

Output:

```
Enter a string: ele
Yes
```

```
Enter a string: no
No
```

Program 22:

WAP to accept a string (a sentence) and returns a string having first letter of each word in capital letter.

Source code:

```
sample_text = str(input("Enter a string: "))
result = ' '.join(elem.capitalize() for elem in sample_text.split())

print(result)
```

Output:

```
Enter a string: this is a sample string
This Is A Sample String
```

Program 23:

Write a program that accepts a string. Count and print the following present in the given string

No. of Characters No. of Spaces

No. of Letters (Alphabet) No. of Digits

No. of Upper-Case Letters No. of Lower-Case Letters

No. of Special Characters No. of Words

Source code:

```python
def count_elements(string): # Function to count the elements
    char_count = len(string) # Counting the characters
    space_count = string.count(' ') # Counting the spaces
    letter_count = sum(c.isalpha() for c in string) # Counting the letters
    digit_count = sum(c.isdigit() for c in string) # Counting the digits
    uppercase_count = sum(c.isupper() for c in string) # Counting the uppercase letters
    lowercase_count = sum(c.islower() for c in string) # Counting the lowercase letters
    special_count = char_count - letter_count - space_count - digit_count # Counting the special characters
    word_count = len(string.split())

    print("No. of Characters:", char_count)
    print("No. of Spaces:", space_count)
    print("No. of Letters (Alphabet):", letter_count)
    print("No. of Digits:", digit_count)
    print("No. of Upper-Case Letters:", uppercase_count)
    print("No. of Lower-Case Letters:", lowercase_count)
    print("No. of Special Characters:", special_count)
    print("No. of Words:", word_count)


# Accepting input from the user
input_string = input("Enter a string: ")

# Counting and printing the elements
count_elements(input_string)
```

Output:

```
Enter a string: This is a sample string.
No. of Characters: 24
No. of Spaces: 4
No. of Letters (Alphabet): 19
No. of Digits: 0
No. of Upper-Case Letters: 1
No. of Lower-Case Letters: 18
No. of Special Characters: 1
No. of Words: 5
```

Program 24:

Write a menu driven program that implements nested loop to print any pattern based on user's choice (Any Three)

Source code:

```
#menu driven program to print pattern based on users choice using nested loop
def display_pattern(num_rows):
    for i in range(1, num_rows + 1):
        for j in range(1, i + 1):
            print("*", end=" ")
        print()

def menu():
    print("Pattern Options:")
    print("1. Right Triangle")
    print("2. Inverted Right Triangle")
    print("3. Pyramid")
    print("4. Inverted Pyramid")
    print("5. Exit")

    choice = int(input("Enter your choice (1-5): "))

    if choice == 1:
        rows = int(input("Enter the number of rows: "))
        display_pattern(rows)
    elif choice == 2:
        rows = int(input("Enter the number of rows: "))
        for i in range(rows, 0, -1):
            for j in range(1, i + 1):
                print("*", end=" ")
            print()
    elif choice == 3:
        rows = int(input("Enter the number of rows: "))
        for i in range(1, rows + 1):
            print(" " * (rows - i) + "* " * i)
    elif choice == 4:
        rows = int(input("Enter the number of rows: "))
        for i in range(rows, 0, -1):
            print(" " * (rows - i) + "* " * i)
    elif choice == 5:
        print("Exiting the program...")
        return
    else:
        print("Invalid choice! Please enter a valid option.")

    menu()

# Calling the menu function to start the program
menu()
```

Output:

```
Pattern Options:
1. Right Triangle
2. Inverted Right Triangle
3. Pyramid
4. Inverted Pyramid
5. Exit
Enter your choice (1-5): 2
Enter the number of rows: 4
* * * *
* * *
* *
*
Pattern Options:
1. Right Triangle
2. Inverted Right Triangle
3. Pyramid
4. Inverted Pyramid
5. Exit
Enter your choice (1-5): 3
Enter the number of rows: 5
    *
   * *
  * * *
 * * * *
* * * * *
```

Link to git repo with all the code:
https://github.com/user7217/comppractical