PART-A

1. Check if a number belongs to the Fibonacci Sequence.

jkfas.py - C:/python/jkfas.py (3.9.7)

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```
n = int(input("Enter a number: "))
a,b = 0,1
while b < n:
    a, b =b,a+b
print("Yes" if b == n else "No")
```

Output :

```
Enter a number: 4
No
```

2.Solve Quadratic Equations

```
import cmath

a = int(input("Enter A : "))
b = int(input("Enter B : "))
c = int(input("Enter C : "))

d=(b ** 2) - (4*a*c)

r1 = (-b-cmath.sqrt(d)) / (2*a)
r2 = (-b+cmath.sqrt(d)) / (2*a)

print("The Solution are {0} and {1} ".format(r1,r2))
```

Output :

```
Enter A : 4
Enter B : 5
Enter C : 8
The Solution are (-0.625-1.2686114456365274j) and (-0.625+1.2686114456365274j)
```

3. Find the sum of n natural numbers

```
n = int(input("Enter A Number :"))

if(n<0):
    print("Enter a Possitive Number ")
else:
    sum =0
    while(n>0):
        sum =sum+n   # OR sum +=n
        n=n-1        # OR num-=1
    print("The Sum is ",sum)
```

Output :

```
Enter A Number :4
The Sum is  10
```

4. Display Multiplication Tables

```
n = int(input("Enter the Number"))
for i in range(1,11):
    print(n,"X",i,"=",n*i)
```

Output :

```
----------------------
Enter the Number5
5 X 1 = 5
5 X 2 = 10
5 X 3 = 15
5 X 4 = 20
5 X 5 = 25
5 X 6 = 30
5 X 7 = 35
5 X 8 = 40
5 X 9 = 45
5 X 10 = 50
```

5. Check if a given number is a Prime Number or not

```
n = int(input("Enter Any Number :"))

if n>1:
    for i in range (2,n):
        if(n % i) == 0:
            print(n,"Is not a Prime Number")
            break
        else:
            print(n,"Is a prime Number")
            break
else:
    print(n,"Is not a Prime Number")
```

Output :

```
Enter Any Number :23
23 Is a prime Number
```

6. Implement a sequential search

```
arr = [3,5,2,1,8,7]
print(arr)
n = int(input("Enter a Number form the List : "))

for i in range(len(arr)):
    if arr[i] == n:
        print(f"The Target Number {n} was found at Index {i}")
        break
    else:
        print(f"The Target number {n} was not found in the list")
```

Output :

```
[3, 5, 2, 1, 8, 7]
Enter a Number form the List : 7
The Target number 7 was not found in the list
The Target number 7 was not found in the list
The Target number 7 was not found in the list
The Target number 7 was not found in the list
The Target number 7 was not found in the list
The Target Number 7 was found at Index 5
```

7. Explore string functions

```
s = "Hello World !"
print(len(s))
print(s.lower())
print(s.upper())
print(s.replace("Hello","Hi"))
name = "Arshad"
print(name.strip())
s2 = "Hello , World !"
print(s2.split(" , "))
```

Output :

```
13
hello world !
HELLO WORLD !
Hi World !
Arshad
['Hello', 'World !']
```

8.Implement of Stack

```
s = []
s.append("a")
s.append("b")
s.append("c")
print("Current Stack")
print(s)
print("POPing The elements form stack")
print(s.pop())
print(s.pop())
print(s.pop())

print("After the poping all 3 ")
print(s)
```

Output:

```
Current Stack
['a', 'b', 'c']
POPing The elements form stack
c
b
a
After the poping all 3
[]
```

PART B

1. **Read and write into a file**

```
file = open("arshad.txt","w")
file.write("Hi Friends, I am Your CR")
file = open("arshad.txt","r")
file_output = file.read()
file.close()

print(file_output)
```

Output:

```
------------------------------
Hi Friends, I am Your CR
```

2. Demonstrate usage of basic regular expression

```
import re

ph = input("Enter the Phone Number")
pattern="\+\d\d\d\d\d\d\d\d\d\d\d\d"    # OR pattern="\+[0-9]{10,10}"
output = re.search(pattern,ph)

if output:
    print("Valid Phone Number ",ph)
else:
    print("Invalid Phone Number",ph)
```

Output :

```
Enter the Phone Number+917760554350
Valid Phone Number  +917760554350
```

3.Demonstrate use of advanced regular expressions for data validation

```
import re
reg_no = input("Enter University Register Number: ")
pattern = "^U[0-9]{2}[C][T]\d\d[S]\d\d\d\d" # OR pattern = "U\d\d[C][T]\d\d[S]\d\d\d\d"
result = re.search(pattern, reg_no)
if result:
 print("Valid University Register Number:", reg_no)
else:
 print("Invalid University Register Number:", reg_no)
```

Output :

```
Enter University Register Number: U01CT23S0049
Valid University Register Number: U01CT23S0049
```

4. Demonstrate use of List

```
def display_menu():
    print("\nMenu:")
    print("1. Append an item")
    print("2. Remove an item")
    print("3. Reverse the list")
    print("4. Exit")
```

```
def main():
    list = []

    while True:
        display_menu()
        c = input("Enter your c (1/2/3/4): ")

        if c == '1':
            item = input("Enter the item to append: ")
            list.append(item)
            print(f"Item '{item}' added. Current list: {list}")

        elif c == '2':
            item = input("Enter the item to remove: ")
            if item in list:
                list.remove(item)
                print(f"Item '{item}' removed. Current list: {list}")
            else:
                print(f"Item '{item}' not found in the list.")

        elif c == '3':
            list.reverse()
            print(f"List reversed. Current list: {list}")

        elif c == '4':
            print("Exiting the program.")
            break

        else:
            print("Invalid c. Please try again.")

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

Output
:

```
Menu:
1. Append an item
2. Remove an item
3. Reverse the list
4. Exit
Enter your c (1/2/3/4): 1
Enter the item to append: 10
Item '10' added. Current list: ['10']

Menu:
1. Append an item
2. Remove an item
3. Reverse the list
4. Exit
Enter your c (1/2/3/4): 1
Enter the item to append: 20
Item '20' added. Current list: ['10', '20']

Menu:
1. Append an item
2. Remove an item
3. Reverse the list
4. Exit
Enter your c (1/2/3/4): 3
List reversed. Current list: ['20', '10']

Menu:
1. Append an item
2. Remove an item
3. Reverse the list
4. Exit
Enter your c (1/2/3/4):
```

5. Demonstrate use of Dictionaries

```
def menu():
    print("Choose an option:")
    print("1. Append")
    print("2. Remove")
    print("3. Reverse")
    print("4. Exit")

def append_item(d):
    key = input("Enter the key to append: ")
    value = input("Enter the value to append: ")
    d[key] = value
    print(f"Appended {key}: {value} to dictionary")

def remove_item(d):
    key = input("Enter the key to remove: ")
    if key in d:
        del d[key]
        print(f"Removed {key} from dictionary")
    else:
        print(f"Key '{key}' not found in dictionary")

def reverse_dict(d):
    # Reverse the dictionary (keys and values swap)
    reversed_dict = {v: k for k, v in d.items()}
    print("Reversed dictionary:")
    print(reversed_dict)
```

```
def main():
    my_dict = {}

    while True:
        menu()
        choice = input("Enter your choice (1-4): ")

        if choice == '1':
            append_item(my_dict)
        elif choice == '2':
            remove_item(my_dict)
        elif choice == '3':
            reverse_dict(my_dict)
        elif choice == '4':
            print("Exiting the program.")
            break
        else:
            print("Invalid choice, please try again.")

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

Output :

```
Choose an option:
1. Append
2. Remove
3. Reverse
4. Exit
Enter your choice (1-4): 1
Enter the key to append: name
Enter the value to append: arshad
Appended name: arshad to dictionary
Choose an option:
1. Append
2. Remove
3. Reverse
4. Exit
Enter your choice (1-4): 1
Enter the key to append: id
Enter the value to append: 101
Appended id: 101 to dictionary
Choose an option:
1. Append
2. Remove
3. Reverse
4. Exit
Enter your choice (1-4): 3
Reversed dictionary:
{'arshad': 'name', '101': 'id'}
Choose an option:
1. Append
2. Remove
3. Reverse
4. Exit
Enter your choice (1-4):
```

6. Demonstrate Exceptions in Python

```
try:
    output = 5/0
    print("I am try Block")
except Exception:   # OR ZeroDivisionError
    print("Error : cannot divide by 0")
finally:
    print("I am Finally")
```

Output :

```
Error : cannot divide by 0
I am Finally
```

ALL BEST Friends