def initializeHashTable():

size = int(input('Enter size of hash table: '))

hashtable = [[-1, 'null'] for \_ in range(size)]

print('Hashtable of size', size, 'is successfully created .....')

print(' ')

return size, hashtable

choice = 1

while choice != 4:

print('\n\*\*\* Menu \*\*\*')

print(' 1.Linear Probing')

print(' 2.Double Hashing')

print(' 3.Exit\n')

choice = int(input('Enter your choice: '))

print()

count = 0

if choice == 1:

size, hashtable = initializeHashTable()

choice1 = 1

while choice1 != 4:

print('\n\* Menu for Linear Probing \*')

print(' 1.Insert')

print(' 2.Search')

print(' 3.Display')

print(' 4.Back\n')

choice1 = int(input('Enter your choice: '))

print()

if choice1 == 1:

if count == size:

print('Hash table is Full .........')

else:

number = int(input('Enter number: '))

name = input('Enter Name: ')

hashvalue = number % size

while hashtable[hashvalue][0] != -1:

print('\nCollision has occurred .....')

print('Now, Calculating new hash value by using linear Probing')

hashvalue = (hashvalue + 1) % size

hashtable[hashvalue][0] = number

hashtable[hashvalue][1] = name

count += 1

print('Data is successfully inserted in the hash table ....')

if choice1 == 2:

number = int(input('Enter number to search: '))

hashvalue = number % size

comparison = 0

while hashtable[hashvalue][0] != number and comparison < size:

hashvalue = (hashvalue + 1) % size

comparison += 1

if comparison < size:

print('The number', number, 'is found at location', hashvalue, 'with total comparisons=', comparison+1)

else:

print('The number is NOT found in the hashtable.... with comparisons', comparison+1)

if choice1 == 3:

for i in range(size):

print('Hash Value', i, '->', hashtable[i])

print('Total inserted record=', count)

print()

if choice == 2:

size, hashtable = initializeHashTable()

choice1 = 1

while choice1 != 4:

print('\n\* Menu for Double Hashing \*')

print(' 1.Insert')

print(' 2.Search')

print(' 3.Display')

print(' 4.Back\n')

choice1 = int(input('Enter your choice: '))

print()

if choice1 == 1:

if count == size:

print('Hash table is Full .........')

else:

number = int(input('Enter number: '))

name = input('Enter Name: ')

hashvalue1 = number % size

i = 1

while hashtable[hashvalue1][0] != -1:

print('\nCollision has occurred .....')

print('Now, Calculating new hash value by Double Hashing Technique')

prime = int(input("\nEnter prime number lesser than size of HASH TABLE: "))

hashvalue2 = hashvalue1 = (hashvalue1 + i \* (prime - (number % prime))) % size

i += 1

hashtable[hashvalue1][0] = number

hashtable[hashvalue1][1] = name

count += 1

print('Data is successfully inserted in the hash table .....')

if choice1 == 2:

number = int(input('Enter number to search: '))

hashvalue1 = number % size

comparison = 0

i = 1

while hashtable[hashvalue1][0] != number and comparison < size:

hashvalue1 = (hashvalue1 + i \* (prime - (number % prime))) % size

comparison += 1

i += 1

if comparison < size:

print('The number', number, 'is found at location', hashvalue1, 'with comparisons', comparison+1)

else:

print('The number is NOT found in the hashtable... with comparisons', comparison+1)

if choice1 == 3:

for i in range(size):

print('Hash Value', i, '->', hashtable[i])

print('Total inserted record=', count)

print()

if choice == 3:

print("Thanks for using this Program !!")

exit()