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**BDA EXPERIMENT NO : 04**

**CODE:**

import mmh3 # Install with: pip install mmh3

from bitarray import bitarray # Install with: pip install bitarray

class BloomFilter:

def \_init\_(self, size, hash\_count):

"""

Initializes the Bloom Filter.

:param size: The size of the bit array.

:param hash\_count: The number of hash functions to use.

"""

self.size = size

self.hash\_count = hash\_count

self.bit\_array = bitarray(size)

self.bit\_array.setall(0)

def add(self, item):

"""

Adds an item to the Bloom Filter.

"""

for i in range(self.hash\_count):

index = mmh3.hash(item, i) % self.size

self.bit\_array[index] = 1

def check(self, item):

"""

Checks if an item might be in the Bloom Filter.

Returns True if possibly in the set, False if definitely not in the set.

"""

for i in range(self.hash\_count):

index = mmh3.hash(item, i) % self.size

if not self.bit\_array[index]:

return False # Definitely not in the set

return True # Possibly in the set

if \_name\_ == "\_main\_":

# Create a Bloom Filter

size = int(input("Enter Bloom Filter size (e.g., 5000): "))

hash\_count = int(input("Enter number of hash functions (e.g., 7): "))

bloom = BloomFilter(size=size, hash\_count=hash\_count)

# Keep track of added items in a separate list

added\_items = []

while True:

print("\n=== Bloom Filter Menu ===")

print("1. Add item")

print("2. Check item")

print("3. Display all added items")

print("4. Exit")

choice = input("Enter your choice: ")

if choice == "1":

item = input("Enter item to add: ")

bloom.add(item)

added\_items.append(item)

print(f"'{item}' added to Bloom Filter.")

elif choice == "2":

item = input("Enter item to check: ")

result = bloom.check(item)

if result:

print(f"'{item}' is possibly in the set (may be a false positive).")

else:

print(f"'{item}' is definitely not in the set.")

elif choice == "3":

if added\_items:

print("Items added so far:", ", ".join(added\_items))

else:

print("No items added yet.")

elif choice == "4":

print("Exiting...")

break

else:

print("Invalid choice, try again.")

**OUTPUT:**

