Scenario

- Hash Table Size (S): 13

- Hash Functions:
    1. h1(k)=k%13
    2. h2(k)=1+(k%12)

- Keys: 25,37,18,49,58

Probing Formula:

$$h(k,i)=(h1(k)+i \cdot h2(k))\%13$$

Step-by-Step Derivation

Insert 25

1. Compute h1(25): h1(25)=25%13=12
2. No collision, place 25 at index 12.

Insert 37

1. Compute h1(37): h1(37)=37%13=11
2. No collision, place 37 at index 11.

Insert 18

1. Compute h1(18): h1(18)=18%13=5
2. No collision, place 181818 at index 5.

Insert 49

1. Compute h1(49):

   h1(49)=49%13=10

   At this point, index 10 is already occupied (as per the previous steps in the example), so a collision occurs.

2. Compute h2(49) (for resolving the collision):

   h2(49)=1+(49%12)=1+1=2

First Probe:
We use double hashing to find a new position:

h(49,1)=(h1(49)+1·h2(49))%13=(10+1·2)%13=12

However, index 12 is already occupied by the key 25, so we have another collision.

Second Probe:
We continue probing using the formula, incrementing i to 2:

   h(49,2)=(h1(49)+2·h2(49))%13=(10+2·2)%13=1

   Index 1 is unoccupied, so place 49 at index 1.

1. Compute h1(58): h1(58)=58%13=6
2. No collision, place 585858 at index **6**.

Final Hash Table

At the end of these insertions, the hash table will look like this (with the collisions resolved using double hashing):

Index	Key
0	
1	49
2	37
3	
4	
5	18
6	58
7	
8	
9	
10	25
11	
12	