

**Question 1** [10 marks]

Insert the sequence

12, 44, 13, 88, 23, 39, 11

into the hash table below using the hash function

$$h_1(k) = (5k + 3) \bmod 11$$

and resolving collisions by double probing with the secondary hash function

$$h_2(k) = 7 - (k \bmod 7)$$

**Index    Value**

0	39
1	
2	12
3	44
4	
5	
6	88
7	23
8	12
9	11
10	

**Question 2** [10 marks]

Let  $U = \{0, 1, 2, \dots, 54\}$  denote the universe of possible keys for a hashing scheme. Suppose that a hash table of size 11 (with indices  $T[0], T[1], \dots, T[10]$ ) is used with the hash function

$$h(k) = (6k + 4) \bmod 11$$

Give a set  $S$  of 5 distinct values in  $U$  which are all mapped to entry  $T[10]$  of the hash table by the hash function  $h(k)$ .

$S =$  1   12   23   34   45