

Data Structure Quiz 7

Total Marks 18

Name: Solution

Roll No. _____

Question: Suppose you are designing a hash table to store a set of records, each containing a unique identifier (ID) and associated data.

The hash function is defined as $H_1(ID) = ID \% 11$, keys = 42, 16, 91, 33, 18, 27, 36, 62

Identify the size of hash table. = 11

If collision happen, resolve it with the help of

1. Quadratic Probing: $h'(ID) = (h(ID) + i^2) \% 11$
2. Double hashing: $h_2(ID) = 8 - (ID \% 8)$
 $h'(ID) = (h_2(ID) + i * h_1(ID)) \% 11$

What are the advantages of Double Hashing over Quadratic Probing?

Help:

$$42 \% 11 = 9$$

$$16 \% 11 = 5$$

$$91 \% 11 = 3$$

$$33 \% 11 = 0$$

$$18 \% 11 = 7$$

$$27 \% 11 = 5$$

$$36 \% 11 = 3$$

$$62 \% 11 = 7$$

Quadratic Probing

$42 \% 11 = 9$	33	0
$16 \% 11 = 5$		1
$91 \% 11 = 3$		2
$33 \% 11 = 0$	91	3
$27 \% 11 = 5$	36	4
$h' = 5 + 1^2 \% 11$	16	5
$= 6$	27	6
$36 \% 11 = 3$		7
$h' = 3 + 1^2 \% 11$	62	8
$= 4$	42	9
$62 \% 11 = 7$		10
$h' = 7 + 1^2 \% 11$		
$= 8$		

Double Hashing

$$27 \% 11 = 5$$

$$h_2 = 8 - (27 \% 8) = 8 - 3 = 5$$

$$h' = 5 + 1 * 5 \% 11 = 10$$

$$36 \% 11 = 3$$

$$h_2 = 8 - (36 \% 8) = 8 - 4 = 4$$

$$h' = 4 + 1 * 3 \% 11 = 7$$

$$h' = 4 + 2 * 3 \% 11 = 10$$

$$h' = 4 + 3 * 3 \% 11 = 2$$

$$62 \% 11 = 7$$

$$h_2 = 8 - (62 \% 8) = 8 - 6 = 2$$

$$h' = 2 + 1 * 7 \% 11 = 9$$

$$h' = 2 + 2 * 7 \% 11 = 5$$

$$h' = 2 + 3 * 7 \% 11 = 1$$

33	0
62	1
36	2
91	3
	4
16	5
	6
18	7
	8
42	9
27	10