# CP2410 Practical 08

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Question 1

Hash function: \$(3i+5) % 11\$

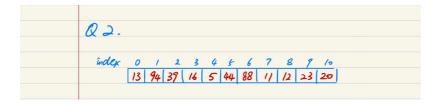
Key	Hash Value
12	8
44	5
13	0
88	5
23	8
94	1
11	5
39	1
20	10
16	9
5	9

and handling collisions with chaining will give us a hash table below:

Q 1.	0 / 2	3 4 + 6	7 8 9	/o
	13 94		12 (6 ) ↑ ↑ 23 5	
	39	88 1	23 5	
		11		

### Question 2

If the collisions are handled by linear probing, we will have a hash table look like this:



#### Question 3

If the collisions are handled by quadratic probing

```
A[h(i) + j^2] \pmod{N}, for j = 0, 1, \cdot N - 1
```

we can build a simple python function helps us to check quadratic probing new values

```
>>> def qh(n):
... for i in range(11):
... print(i, ((3*n)+5+i^2)%11)
...
```

and insert elements up to the point of failure, we will have a hash table look like this:

<b>Q</b> 3.
index 0 1 2 3 4 5 6 7 8 9 10  13 94 39 11 44 38 16 12 23 20
88 collides at 5, 5 h(i)
23 collides at 8, 5 h(i)
11 collides at 5, \$ h(i) 1 6 2 9
3 3
39 collides at 1, 5 hli)
16 collides at 9. j hli) 1 10 2 2
3 <u>T</u>

	5 collides at 9. j h(i)
-	1 10
	ع ع
	<sup>3</sup> 7
	4 3
	5 1
	6
	7 3
	8 7
	9 2
	ĺo (o
	Since we cannot get a hash value of 4.
	Since we cannot get a hash value of 4, the hash table fails to insert 5

### Question 4

If the collisions are handled by double hashing

```
H(i) = (h(i) + j*h'(i)) \mod N, for j = 0, 1, \cdots, N - 1
```

we can build a simple python function helps us to check quadratic probing new values

```
>>> def sec_h(n):
... return 7 - (n%7)
...
>>> def h(n):
... return (3*n + 5) % 11
...
>>> def dh(n):
... for i in range(11):
... print(i, (h(n) + i * sec_h(n))%11)
```

the final hash table would look like this:

Q4.
index 0 1 2 3 4 6 6 7 8 9 10
index 0 1 2 3 4 5 6 7 8 9 10  13 94 23 88 39 44 11 5 12 16 20
88 Collides at 5, 3 h(i)
1 8
2 0
3 3
23 collides at 8, 3 hci)
/ 2
11 collides at 5, j h(i)
/ 8
2 0
3 3
4 6
39 a Wides at 1 i h(i)
39 collides at 1, \$ h(i)
7
5 collides at 9, j h(i)
عُ عُ
3 4
4 6
5 8
6 (0
7 /
8 3 9 5
<i>lo</i> <u>1</u>

## Question 5

## Question 6