3. **(30 points)** Using a hash table T of size $m = 11$ (i.e., $T[0 \cdots 10]$) with hash function $hash(x) = x \% m$, show the hash table that results after the following keys are inserted in the given order: 26 42 5 44 92 59 40 36 12.

For each of the following probing methods, show the resulting hash table.

(a) Linear probing, i.e., $h_i(x) = (hash(x) + i) \% m$, for $i = 0, 1, 2, \ldots$.

```
The following is the current hash table:
The entry 0 is 44
The entry 1 is 12
The entry 2 is empty.
The entry 3 is 36
The entry 4 is 26
The entry 5 is 5
The entry 6 is 92
The entry 7 is 59
The entry 8 is 40
The entry 9 is 42
The entry 10 is empty.
```

(b) Quadratic probing, i.e., $h_i(x) = (hash(x) + i^2) \% m$, for $i = 0, 1, 2, \ldots$.

```
The following is the current hash table:
The entry 0 is 42
The entry 1 is 36
The entry 2 is 44
The entry 3 is 12
The entry 4 is 92
The entry 5 is 59
The entry 6 is 26
The entry 7 is 5
The entry 8 is empty.
The entry 9 is empty.
The entry 10 is 40
```

(c) Double hashing using the secondary hash function $hash_2(x) = (x \% 9) + 1$, i.e., $h_i(x) = (hash(x) + i \cdot hash_2(x)) \% m$, for $i = 0, 1, 2, \ldots$. Note that this secondary hash function does not follow the style we discussed in class, but theoretically we can pick any function as the secondary hash function.

```
The following is the current hash table:
The entry 0 is 44
The entry 1 is 40
The entry 2 is 12
The entry 3 is 36
The entry 4 is 26
The entry 5 is 5
The entry 6 is empty.
The entry 7 is 92
The entry 8 is empty.
The entry 9 is 42
The entry 10 is 59
```