

FIT1008 Introduction to Computer Science (FIT2085 for Engineers)

Tutorial 11 Semester 1, 2019

Objectives of this tutorial

- To understand Hash Tables.

Exercise 1 *

Using the following hash function:

```
1 def hash(input_string):  
2     return ord(input_string[0]) % 11
```

and linear probing, calculate the hash value of the following names and insert them into a Hash Table of size 11.

```
1 Eva, Amy, Tim, Ron, Jan, Kim, Dot, Ann, Jim, Jon
```

Note that the ascii value for E is 69, for A 65, for T 84, for R 82, for J 74, for K 75, and for D 68.

Exercise 2 *

Assume you have completed Exercise 1. Illustrate what happens, when you search for the names Jim, Jon and Joe.

Exercise 3 *

Repeat Exercises 1 and 2 using Quadratic probing instead of linear probing.

Exercise 4 *

Using the following function:

```
1 def hash2(input_string):  
2     return ord(input_string[0]) % 10 + 1
```

as the second hash function, repeat Exercise 1 and 2 using double hashing instead of linear probing.

Is the second hash function a good choice of function? Discuss in terms of the values provided for keys that are mapped to the same value by the first hash function.

Exercise 5

One of the methods to delete an element at position N from a Hash Table that uses linear probing is to re-insert every element from N+1, N+2, N+3, etc, until an empty cell is found. Why is this necessary? Explain by giving an example in which if we don't do this, things go wrong.

Exercise 6

We said that, when performing double hashing, it is important for the second hash function not to return 0. Explain why. How does the above **hash2** function achieve this?