Lecture 9 – notes

*Direct address tables:*

* Representation:
  + Use an array T with m positions
  + Data about element with key k, will be stored in the T[k] slot
  + Slots not corresponding to existing elements will contain the value NIL
* Disadvantages
  + The keys must be natural numbers
  + The keys must come from a small universe (interval)
  + The number of actual keys can be a lot less than the cardinal of the universe (storage space is wasted)

*Heuristics:*

* Division method:
* Mid-square method:
  + Take length of table
  + Take the middle r digits of the square of the number:
* Multiplication method

, where

m - the hash table size

A - constant (0 < A < 1)

frac(x) - fractional part of x

* Universal hashing
  + Fix a prime number p > the maximum possible value for a key from U.
  + For every and we can define

*Collision resolution methods: (continues in lecture 10)*

* Separate chaining
  + Collision resolution by separate chaining: each slot from the hash table T contains a linked list, with the elements that hash to that slot
  + If we have to implement a sorted container on a hash table with separate chaining, we can store the individual lists in a sorted order and for the iterator we can return them in a sorted order