WEEK 07

1. Preparation for Assignment

If, and *only if* you can truthfully assert the truthfulness of each statement below are you ready to start the exercises.

1.1. Reading Comprehension Self-Check.

- I know that **input enhancement** is the idea of preprocessing some or all of a problem's input, and storing the additional information obtained to accelerate solving the problem afterward.
- I know why it is **false** to say that the two principal resources of time and space compete with each other in **all** design situations.
- We know why sorting by distribution counting is more efficient than quick-sort.
- I know why it is **false** to say that data compression is a typical space-time tradeoff.
- I know that **prestructuring** creates structures that allow faster and/or more flexible access to data.
- I know why it is **false** to say that these pre-structured structures typically use less space than otherwise required.
- I know that hashing enables, on average, constant-time searching, insertion, and deletion.

1.2. Memory Self-Check.

1.2. Memory Self-Check. For k being a letter of some alphabet, let the function $ord\ ::\ k \to a ::: Intger$ have a value that is the position of k in that alphabet.

Which hash function below produces a hash with fewer potential collisions?

(1)

$$hash\ ::\ [k] \to a ::: Integer$$

$$\begin{aligned} hash\ ::\ [h \mid t] \to \\ ord\ h + hash\ t \end{aligned}$$

, or

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(2) Let c be greater than any element of the alphabet and $mod\ ::\ a\ b$ be the modulo function a mod b.

$$hash\ ::\ [k] \rightarrow a\ :::\ Integer$$

$$\begin{aligned} hash\ &::\ [h \mid t] \rightarrow \\ &\quad mod\ h \cdot c + (ord\ h)\ m \end{aligned}$$

Why?

2. Week 07 Exercises

2.1. **Exercise 1 on page 274.**

2.2. **Exercise 2 on page 274.**

2.3. **Exercise 3 on page 275.**

2.4. **Exercise 4 on page 275.**

2.5. **Exercise 3 on page 279.**

2.6. **Exercise 6 on page 279.**

3. Week 07 Problems

3.1. **Not in the Book.** Consider a significant algorithm you have implemented in the past. Review it to see if there is a way to use additional memory to speed up the calculation of the result.