CSE 311: Foundations of Computing I — Autumn 2017

Final Exam Definitions

All *new* definitions that are relevant to the exam. They will be repeated on the exam itself, but you might find it useful to read and understand them before the exam to reduce reading time during the actual exam.

All *old* definitions that you are expected to know (modular arithmetic, undecidability, cardinality, set theory) **DO NOT** appear on this list but could be tested on the exam.

(a) $S^* = S^0 \cup S^1 \cup \cdots =$ the set of all strings made up of characters in S

(b) A function is *increasing* iff $a \leq b \to f(a) \leq f(b)$

(c) We say a binary relation $R \subseteq A \times B$ is an injection iff

$$\forall((x,a) \in R)\forall((y,b) \in R)(a = b \to x = y)$$

(d) Let $\Sigma = \{0,1,2,3,4,5,6,7,8,9,[,],\textbf{,}\}$. Define $S(s)$ where $s \in \Sigma^*$ as the set of numbers defined by interpreting s as a List. If no such interpretation exists, $S(s) = \varnothing$. For example, $S(]]]][) = \varnothing$, $S([10,10,10,10]) = \{10\}$, and $S([1,400,3,2,1]) = \{1,2,3,400\}$.

(e)

$$\textbf{List} = [] \mid \textbf{Int} :: \textbf{List}$$

$$\begin{aligned}
\text{in}(a, []) &= \text{false} \\
\text{in}(a, x :: L) &= a = x \text{ or } \text{in}(a, L) \\[1em]
\text{append}(a, []) &= a :: [] \\
\text{append}(a, x :: L) &= x :: \text{append}(a, L) \\[1em]
\text{remove}(a, []) &= [] \\
\text{remove}(a, x :: L) &= \text{if } a = x \text{ then } \text{remove}(a, L) \text{ else } x :: \text{remove}(a, L)
\end{aligned}$$