Homework 2 for cs 421, Fall 2012

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1) (1). $\rho_1 = \{x \to 5\}$, $\rho_2 = \{x \to 5, y \to 3, z \to 8\}$, the environment at point 1 is

$$a_1 = \{\text{plus\_x} \to \langle y \to x + y, \rho_1 \rangle\} + \rho_2$$

(2). $\rho_3 = \{x \to 5, y \to -5, z \to 8\}$, the environment at point 2 is

$$a_2 = \{\text{sub\_z} \to \langle x \to y - z, a_1 \rangle\} + \{\text{plus\_x} \to \langle y \to x + y, \rho_1 \rangle\} + \rho_3$$

(3). The environment is

$$a_3 = \{\text{f\_z} \to \langle x \to val, a_2 \rangle\} + \{\text{sub\_z} \to \langle x \to y - z, a_1 \rangle\} + \{\text{plus\_x} \to \langle y \to x + y, \rho_1 \rangle\} + \rho_3$$

2) The evaluation process is as follows:

- The value of y is given to x: $x \to y \to -5$.
- $x = -5$ is given to plus_x, in the function of plus_x, $y \to x \to -5$, $x \to 5$ from ρ_1, and result 0 is returned.
- The result 0 is compared with $z \to 8$ in function f_z, the result is true.
- $x = -5$ is given to sub_z, in function sub_z, $x \to -5$, $y \to 3, z \to 8$ from a_1, and result $3-8 = -5$ is returned.
- Back in function f_z, the returned value -5 is returned and outputted.