

Abstract machine CEK+go overview sheet

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Programs

$$\begin{aligned} M ::= & x \\ & | (M_1 M_2) \\ & | \lambda x.M \\ & | n \\ & | \text{go } M \\ & | \text{here } M \end{aligned}$$

Values

$$\begin{aligned} W ::= & n \\ & | \text{clos}(\lambda x.M, E) \end{aligned}$$

Frames and continuations=sequences of frames

$$\begin{aligned} F ::= & (W \circ) \\ & | (\circ M E) \\ & | \blacktriangleright\blacktriangleright \\ K ::= & F^* \end{aligned}$$

CEK+go machine transition steps \rightsquigarrow

$$\begin{aligned} \langle x \mid E \mid K \rangle & \rightsquigarrow \langle \text{lookup } x \text{ in } E \mid E \mid K \rangle & (1) \\ \langle M_1 M_2 \mid E \mid K \rangle & \rightsquigarrow \langle M_1 \mid E \mid (\circ M_2 E), K \rangle & (2) \\ \langle \lambda x.M \mid E \mid K \rangle & \rightsquigarrow \langle \text{clos}(\lambda x.M, E) \mid E \mid K \rangle & (3) \\ \langle W \mid E_1 \mid (\circ M E_2), K \rangle & \rightsquigarrow \langle M \mid E_2 \mid (W \circ), K \rangle & (4) \\ \langle W \mid E_1 \mid (\text{clos}(\lambda x.M, E_2) \circ), K \rangle & \rightsquigarrow \langle M \mid E_2[x \mapsto W] \mid K \rangle & (5) \\ \langle \text{here } M \mid E \mid K \rangle & \rightsquigarrow \langle M \mid E \mid \blacktriangleright\blacktriangleright, K \rangle & (6) \\ \langle \text{go } M \mid E \mid K_1, \blacktriangleright\blacktriangleright, K_2 \rangle & \rightsquigarrow \langle M \mid E \mid K_2 \rangle & (7) \\ \langle W \mid E \mid \blacktriangleright\blacktriangleright, K \rangle & \rightsquigarrow \langle W \mid E \mid K \rangle & (8) \end{aligned}$$