Definition 0.0.5 (Action) The *action relation* $\rightarrow$ is the smallest relation between processes that satisfy the following rules:

$$c?(\overline{X}).R \xrightarrow{c?\overline{V}} \mathrm{R}[\![\overline{V}/\overline{X}]\!] \qquad \text{(A-IN)}$$

$$c!\langle\overline{V}\rangle \xrightarrow{c!\overline{V}} \mathit{stop} \qquad \text{(A-OUT)}$$

$$\text{rec } x.R \xrightarrow{\tau} R[\![^{\text{rec } x.R}/_{x}]\!] \qquad \text{(A-REP)}$$

$$\text{if } v = v \text{ then } P \text{ else } Q \xrightarrow{\tau} P \qquad \text{(A-EQ)}$$

$$\text{if } v_1 = v_2 \text{ then } P \text{ else } Q \xrightarrow{\tau} Q \qquad v_1 \neq v_2 \qquad \text{(A-NEQ)}$$

$$\frac{P \xrightarrow{\alpha} P'}{P \mid Q \xrightarrow{\alpha} P' \mid Q} \qquad bn(\alpha) \cap fn(Q) = \emptyset \qquad \text{(A-COMP)}$$

$$\frac{P \xrightarrow{\alpha} P'}{\text{new}(b).P \xrightarrow{\alpha} \text{new}(b).P'} \qquad b \notin n(\alpha) \qquad \text{(A-REST)}$$

$$\frac{P \xrightarrow{(\overline{B})c!\overline{V}} P'}{\text{new}(n).P \xrightarrow{(n,\overline{B})c!\overline{V}} P'} \qquad n \neq c, n \text{ is in } \overline{V} \qquad \text{(A-OPEN)}$$

$$\frac{P \xrightarrow{c?\overline{V}} P',\ Q \xrightarrow{(\overline{B})c!\overline{V}} Q'}{P \mid Q \xrightarrow{\tau} \text{new}(\overline{B}).(P' \mid Q')} \qquad (\overline{B}) \cap fn(P) = \emptyset \qquad \text{(A-COMM)}$$