E.g.
$$\{ x > 0 \}$$
 $\{ y := x \}$
 $\{ y := x + y \}$
 $\{ y \} P_1 \{ y \} P_2 \{ x \}$
 $\{ y \} P_1 \{ y \} P_2 \{ x \}$
 $\{ x > 0 \} Y := x \{ r(x, y, z) \}$
 $\{ r(x, y, z) \} z := x + y \{ z > 0 \}$

interpretation of (acy12)

$$\begin{array}{ll}
\text{()} \{x>0\} \ y:=& x \ \{x>0 \land y>0\} \\
\text{()} \{x>0\} \ y:=& x \ \{x>0 \land y>0\} \\
\text{()} \{x>0\} \ y:=& x \ y\in Z>0 \\
\text{()} \{x>0\} \ y:=& x \ y\in Z>0
\end{array}$$

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\text{()} \{x>0\} \ y:=$$

Horn clauses (or constrained from clauses)

Unknown

Stelations

Stendard

interpretal

either

Pointal

enc(...)

ar

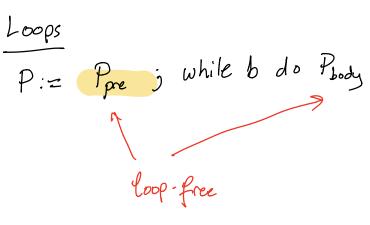
interpretal

formula

HEAD

C = { c1, c2, ..., cn}

C is satisfiable if there is an interpretation of Ti that makes the clauses UALID



prave that {\$7P{\pi_3}}

- (i) the invariant is true when we finish Ppre $C_1 \triangleq (\emptyset \land enc(Ppre)) \Longrightarrow T(V')$ Initialize
- (2) the invariant must remain to be as the loop executer and which $C_2 \triangleq \left(\mathbb{I}(V) \wedge b \wedge \text{enc}(P_{body}) \right) \Rightarrow \mathbb{I}(V')$
- (3) when the loop exits, post condition is satisfied $C_3 \triangleq (I(V) \land 7b) \Longrightarrow \forall$ satisfied

$$[x \neq 0 \land 4 \neq 0]$$

$$[x \Rightarrow 0 \land 4 \Rightarrow 0 \land 4 \neq 0]$$

$$[x \Rightarrow 0 \land 4 \Rightarrow 0 \land 4$$

$$C_{1} \triangleq x > 0 \land 4 > 0 \land enc(P_{pre}) \Rightarrow I(x', y', r', 9')$$

$$C_{2} \triangleq I(x, y, r, 9) \land r > y \land enc(P_{body}) \Rightarrow I(x', y', r', 9')$$

$$C_{3} \triangleq I(x, y, r, 9) \land r < y \Rightarrow (x = 7*9 + r) \land (0 < r < y)$$

Every statement P will have a line number L(P) $L_1(P)$ the line number ap the next state $L_2(P)$ the other possible line number

encH (
$$x := a$$
) = $I_{i}(V)$ \wedge enc ($x := a$) \Rightarrow $I_{j}(V')$

$$L(x := a) = i \qquad L_{1}(x := a) = j$$

$$\{T_{i}(V)\} \propto := a \qquad \{T_{j}(V)\}$$

$$encH(if b + han P, elx P_{i}) = I_{i}(V) \wedge b \Rightarrow T_{j}(V)$$

$$T_{i}(V) \wedge 7b \Rightarrow T_{k}(V)$$

$$L(P) = i \qquad L_{1}(P) = j \qquad L_{2}(P) = k$$

$$encH(while b do P) = I_{1}(V) \wedge b \Rightarrow T_{2}(V)$$

$$T_{1}(V) \wedge b \Rightarrow T_{k}(V)$$

$$T_{2}(V) \wedge b \Rightarrow T_{k}(V)$$

$$T_{3}(V) \wedge b \Rightarrow T_{k}(V)$$

$$T_{4}(V) \Rightarrow V$$

$$e.y.$$
 $fx>0$

$$f(x>5)$$

$$0 \text{ if } x > 5$$

g)
$$x = x+1$$

(4)
$$5kip;$$

$$\left\{ 2>0\right\}$$

(3)
$$\mathbb{I}_3(x) \wedge x' = x + 1 \Longrightarrow \mathbb{I}_4(x')$$

$$(x), I \iff 0 < x$$

$$I_{\psi}(x) \Longrightarrow x > 0$$

$$\frac{mc(p):}{if} p>|00|$$

$$\Gamma:=p-10$$
elce
$$P_{1}:=mc(P_{1})$$

$$\Gamma:=mc(P_{2})$$

$$Threat mc(p_{1}) as a relation in Poly
$$P>|00| \Lambda \Gamma = p-10 \implies mc(p_{1}\Gamma) \implies mc(p_{2}\Gamma)$$

$$000 \Lambda P_{1}=p+11 \Lambda mc(P_{1}P_{2}) \Lambda mc(P_{2}\Gamma) \implies mc(P_{2}\Gamma)$$$$

P < 100 AP = P+11 AMC(P, P2) AMC(P215) => MC(P15) Encode Mc(PIF)