Notes for BPOS final exam

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Invariant 1

$$tc(c)$$

Invariant 2

$$\textit{p-targets}(c) \equiv \forall x \in SV(c) : (\textit{pointer}(x,c) \wedge c.m(x) \neq \textit{null} \rightarrow \textit{ingm}(c.m(x),c) \vee \textit{onheap}(c.m(x),c))$$

Invariant 3 We say that $\textit{inv-pr}(c)$ holds if the following conditions are fulfilled:

1. $$\#\{i | c.pr[i] \in L(rSt)\} = c.rd + 1,$$
2. $$\textit{last}(c.pr) \in L(rSt),$$
3. $$j \in [0 : c.rd] \wedge k \in Irt(j,c) \rightarrow c.pr[k] \in c.st(j).$$

Invariant 4 We say that $\textit{inv-rds}(c)$ holds if for all $i \in [1 : c.rd]$ the following conditions are fulfilled:

1. $$\textit{vtype}(c.rds(i),c) = ft(c.st(i)).t,$$
2. $c.rds(i) = x \rightarrow \textit{onheap}(x,c) \vee \textit{ingm}(x,c) \vee \exists s \in S^*, j < i : x = ST(j,c)s.$

Invariant 5

$$\textit{inv-conf}(c) \equiv tc(c) \wedge \textit{p-targets}(c) \wedge \textit{inv-pr}(c) \wedge \textit{inv-rds}(c).$$

Invariant 6 We say that $\textit{inv-expr}(e,c)$ holds if the following conditions are fulfilled:

1. Left values $lv(e,c)$ — if they exist — are subvariables of the current configuration:
$$lv(e,c) \in SV(c).$$
2. The variable type of the left value of an expression is the expression type of the expression:
$$\textit{vtype}(lv(e,c),c) = \textit{etype}(e,f).$$

3. The value of an expression is in the range of its expression type:

$$va(e, c) \in ra(etype(e, f)).$$

4. Expressions with pointer type $t'*$ and a non-null value point to a subvariables of c which have type t':

$$etype(e,) = t'* va(e, c) \neq null \rightarrow va(e, c) \in SV(c) \wedge vtype(va(e, c), c) = t'.$$

5. Non-null pointers in expression evaluation point to the global memory or the heap:

$$etype(e, f) = t'* \wedge va(e, c) \neq null \rightarrow ingm(va(e, c), c) \vee onheap(va(e, c), c).$$

Invariant 7

$$inv\text{-}prn\text{-}pr(c) \equiv \forall i : c.pr[i] = bw(c.prn(i))$$