

# Assignment 2: Verification

Maxwell Bo 43926871

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## 1 Part A

Given

$$\begin{aligned} pre &\triangleq D.len \geq \max(\{A.len, B.len, C.len\}) \\ &\wedge \text{sorted}(A) \wedge \text{sorted}(B) \wedge \text{sorted}(C) \end{aligned}$$

and

$$\begin{aligned} post &\triangleq D = A \cap B \cap C \\ &\wedge r \in [0, D.len] \wedge i \in [0, A.len] \wedge j \in [0, B.len] \wedge k \in [0, C.len] \\ &\wedge (i = A.len \vee j = B.len \vee k = C.len) \end{aligned}$$

$$D, r, i, j, k : [pre, post]$$

$$\sqsubseteq \{ \text{Composition: middle predicate is } inv \}$$

$$D, r, i, j, k : [pre, inv]; D, r, i, j, k [inv, post]$$

$$\begin{aligned} inv &\triangleq D_{[0,r)} = A_{[0,i)} \cap B_{[0,j)} \cap C_{[0,k)} \\ &\wedge r \in [0, D.len] \wedge i \in [0, A.len] \wedge j \in [0, B.len] \wedge k \in [0, C.len] \end{aligned}$$