3.10

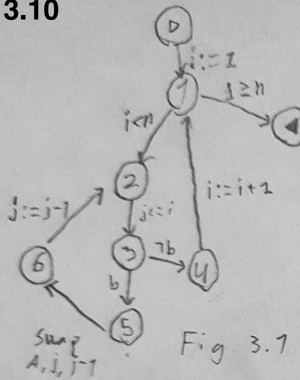

Fig 3.1

we will show that for all

$(q_\circ, a, q_\bullet) \in E$ and all $(\sigma, \underline{\sigma})$

$$((\sigma,\underline{\sigma}) \models P(q_\circ) \land \sigma' = S[\![a]\!](\sigma)) \Rightarrow (\sigma', \underline{\sigma}) \models P(q_\bullet)$$

we can go through all edges in Fig 3.1, but will just show a few:

$(\triangleright, i:=1, 1)$:

from $P(\triangleright)$: $A = \underline{A}$ and therefore

$(\sigma', \underline{\sigma}) \models permuted(A, n, \underline{A})$

$\sigma' = \sigma[i \mapsto 1]$ and from example 3.2

$(\sigma, \underline{\sigma}) \models sorted(A, 0, 1)$ is a tautology

and therefore holds.

So $((\sigma, \underline{\sigma}) \models P(\triangleright) \land \sigma' = S[\![i:=1]\!]\sigma) \Rightarrow (\sigma', \underline{\sigma}) \models P(1)$

$(1, i<n, 2)$:

as $S[\![1<n]\!]\sigma = \sigma$ and $(\sigma, \underline{\sigma}) \models P(1)$

then $(\sigma, \underline{\sigma}) \models sorted(A,0,i) \land permuted(A,n,\underline{A}) \land i<n$

$(2, j:=i, 3)$:

from $P(2)$: $(\sigma', \underline{\sigma}) \models permuted(A, n, \underline{A})$

from def of Almost if $\sigma' = [\![j \mapsto i]\!]$

then $(\sigma', \underline{\sigma}) \models Almost(A, 0, j, i+1)$

$(5, swap, 6)$:

from $P(5)$: $(\sigma, \underline{\sigma}) \models permuted(A, n, \underline{A})$

from $\sigma' = S[\![swap(A, j, j-1)]\!]$ and $(\sigma, \underline{\sigma}) \models P(5)$

$(\sigma', \underline{\sigma}) \models P(6)$