

# Swarmed Multi-core Nested Depth First Search

code for worker  $i$

```
procedure DFSblue( $s, i$ )  
   $s.\text{blue}[i] := \text{true}$   
  for all  $t \in \text{post}(s)$  do  
    if  $\neg t.\text{blue}[i]$  then DFSblue( $t, i$ )  
  if  $s \in \text{Accepting}$  then  
     $\text{seed}[i] := s$   
    DFSred( $s, i$ )
```

```
procedure DFSred( $s, i$ )  
   $s.\text{red}[i] := \text{true}$   
  for all  $t \in \text{post}(s)$  do  
    if  $t = \text{seed}[i]$  then ExitCycle  
    if  $\neg t.\text{red}[i]$  then DFSred( $t, i$ )
```

## Multi-core Swarmed NDFS

- ▶  $N$  workers perform parallel search **independently**  
[G. Holzmann et al.]
- ▶ **Multi-core**: store visited states in a shared hash table  
[FMCAD 2010, SPIN 2011]
- ▶ Scales well in the presence of accepting cycles (bugs)
- ▶ Otherwise, all workers traverse the whole graph