

# Dependence-Aware, Unbounded Sound Predictive Race Detection

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**Strong  
Dependently  
Precedes**

- No false races
- More races than WCP (Kini et al, 2017)

**Weak  
Dependently  
Precedes**

- Finds all races knowable from a single execution unlike WCP and DC (Roemer et al, 2018)

	Prior Work			Our Work	
	$\prec_{HB}$	$\prec_{WCP}$	$\prec_{DC}$	$\prec_{SDP}$	$\prec_{WDP}$
Critical section ordering Orders rel to...	All acq	Conflicting wr/rd		wr-rd and rd-wr wr/rd or next rd	Last wr-rd Next br
Includes $\prec_{PO}$ ?	Yes	No	Yes	No	Yes
Composes with $\prec_{HB}$ ?	Yes	Yes	No	Yes	No
$acq(m) \prec rel(m)$ $\Rightarrow rel(m) \prec rel(m)$	Yes	Yes	Yes	Yes	Yes
Transitive?	Yes	Yes	Yes	Yes	Yes

Thread 1    Thread 2

wr(x)  
acq(m)  
wr(y)  
rel(m)

Prior	Ours
WCP-race? No	SDP-race? Yes
DC-race? No	WDP-race? Yes
Predictable race?	Yes

acq(m)  
wr(y)  
rel(m)  
rd(x)

Thread 1    Thread 2

wr(y)  
acq(m)  
wr(x)  
rel(m)

Prior	Ours
WCP-race? No	SDP-race? No
DC-race? No	WDP-race? Yes
Predictable race?	Yes

acq(m)  
rd(x)  
rd(y)  
br  
rel(m)

Thread 1    Thread 2

acq(m)  
wr(y)  
rd(x)  
br  
rel(m)

Prior	Ours
WCP-race? No	SDP-race? No
DC-race? No	WDP-race? Yes
Predictable race?	Yes

acq(m)  
wr(x)  
rel(m)  
rd(y)

Thread 1    Thread 2

acq(m)  
rd(x)  
br  
wr(y)  
rel(m)

Prior	Ours
WCP-race? No	SDP-race? No
DC-race? No	WDP-race? Yes
Predictable race?	No

acq(m)  
wr(x)  
rel(m)  
rd(y)

	Prior work WCP-races	Our work SDP-races
avroa	5	5
batik	0	0
h2	9	9
luindex	1	1
lusearch	0	0
pmd	6	8
sunflow	2	2
tomcat	86	91
xalan	21	52

	Prior work DC-races	Our work WDP-races	Verified WDP-races
avroa	5	5	5
batik	0	0	0
h2	11	12	11
luindex	1	1	1
lusearch	0	1	0
pmd	9	10	9
sunflow	2	2	2
tomcat	94	284	158
xalan	17	170	168



THE OHIO STATE UNIVERSITY  
COLLEGE OF ENGINEERING

Talk on Friday  
12:07 - 12:30  
in Olympia



SPLASH  
ATHENS 2019