

6. Implement and study the performance of CDMA on NS2/NS3 (Using stack called Call net) or equivalent environment.

```
set stop 100 ;
```

```
set type cdma ;
```

```
set minth 30
```

```
set maxth 0
```

```
set adaptive 1 ;
```

```
set flows 0 ;
```

```
set window 30 ;
```

```
set opt(wrap) 100 ;
```

```
set opt(srcTrace) is ;
```

```
set opt(dstTrace) bs2 ;
```

```
set bwDL(cdma) 384000
```

```
set propDL(cdma) .150
```

```
set ns [new Simulator]
```

```
set tf [open out.tr w]
```

```
$ns trace-all $tf
```

```
set nodes(is) [$ns node]
```

```
set nodes(ms) [$ns node]
```

```
set nodes(bs1) [$ns node]
```

```
set nodes(bs2) [$ns node]
```

```
set nodes(lp) [$ns node]
```

```

proc cell_topo {} {
global ns nodes
$ns duplex-link $nodes(lp) $nodes(bs1) 3Mbps 10ms DropTail
$ns duplex-link $nodes(bs1) $nodes(ms) 1 1 RED
$ns duplex-link $nodes(ms) $nodes(bs2) 1 1 RED
$ns duplex-link $nodes(bs2) $nodes(is) 3Mbps 50ms DropTail
puts " cdma Cell Topology"
}

```

```

proc set_link_para {t} {
global ns nodes bwDL propDL
$ns bandwidth $nodes(bs1) $nodes(ms) $bwDL($t) duplex
$ns bandwidth $nodes(bs2) $nodes(ms) $bwDL($t) duplex
$ns delay $nodes(bs1) $nodes(ms) $propDL($t) duplex
$ns delay $nodes(bs2) $nodes(ms) $propDL($t) duplex

$ns queue-limit $nodes(bs1) $nodes(ms) 20
$ns queue-limit $nodes(bs2) $nodes(ms) 20
}

```

```

Queue/RED set adaptive_ $adaptive
Queue/RED set thresh_ $minth
Queue/RED set maxthresh_ $maxth
Agent/TCP set window_ $window

```

```

source web.tcl

```

```

switch $type {
cdma {cell_topo}
}

set_link_para $type
$ns insert-delayer $nodes(ms) $nodes(bs1) [new Delayer]
$ns insert-delayer $nodes(ms) $nodes(bs2) [new Delayer]

if {$flows == 0} {
set tcp1 [$ns create-connection TCP/Sack1 $nodes(is) TCPSink/Sack1
$nodes(lp) 0]
set ftp1 [[set tcp1] attach-app FTP]
$ns at 0.8 "[set ftp1] start"
}

proc stop {} {
global nodes opt tf
set wrap $opt(wrap)
set sid [$nodes($opt(srcTrace)) id]
set did [$nodes($opt(dstTrace)) id]

set a "out.tr"

set GETRC "../..../bin/getrc"
set RAW2XG "../..../bin/raw2xg"

exec $GETRC -s $sid -d $did -f 0 out.tr | \
$RAW2XG -s 0.01 -m $wrap -r > plot.xgr

```

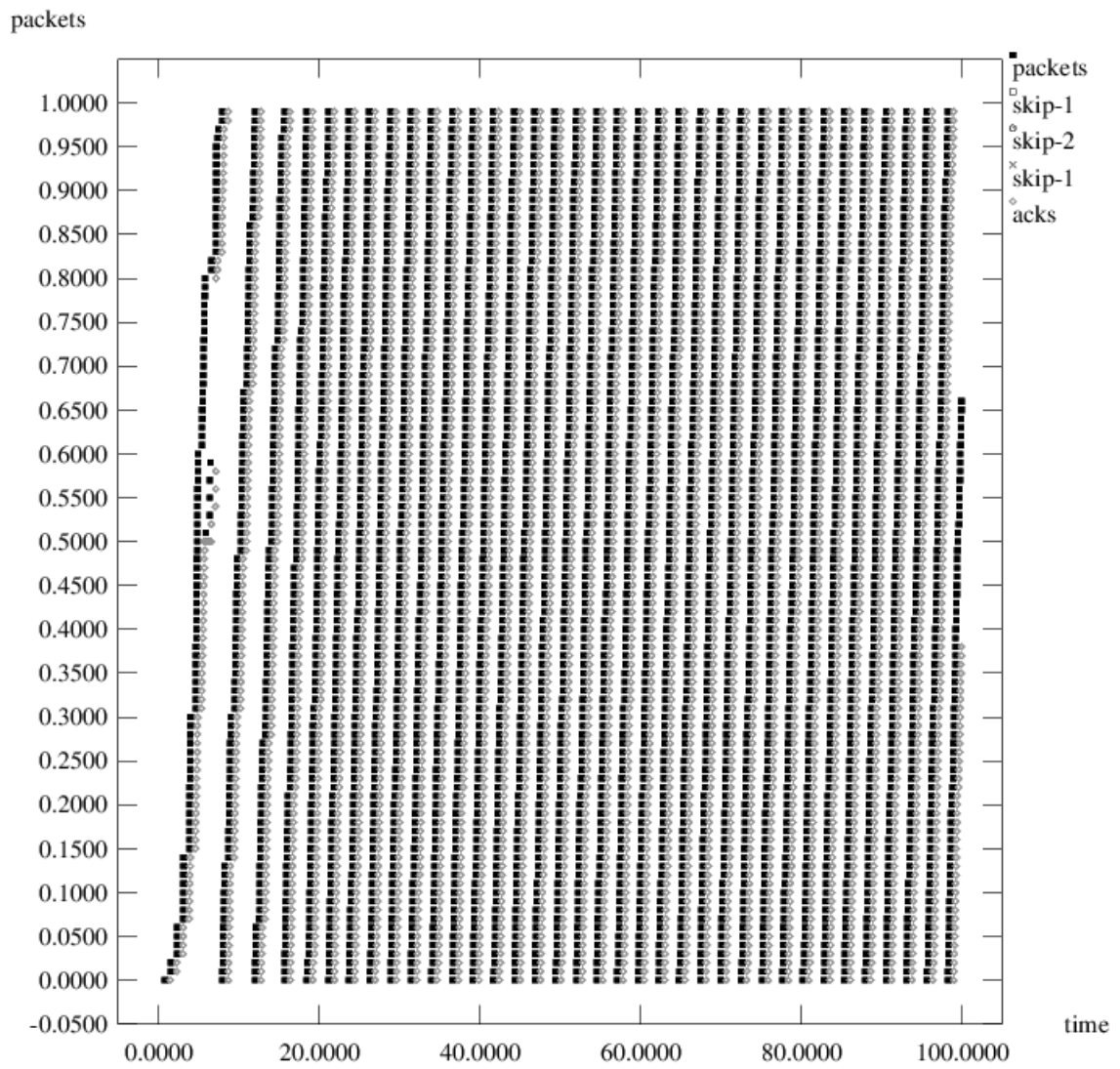
```
exec $GETRC -s $did -d $sid -f 0 out.tr | \  
$RAW2XG -a -s 0.01 -m $wrap >> plot.xgr
```

```
exec xgraph -x time -y packets plot.xgr &  
exit 0  
}
```

```
$ns at $stop "stop"
```

```
$ns run
```

Output:



## CDMA Trace File:

```
Open [icon] Save
+ 0.8 0 3 tcp 40 ----- 0 0.0 4.0 0 0
- 0.8 0 3 tcp 40 ----- 0 0.0 4.0 0 0
r 0.850107 0 3 tcp 40 ----- 0 0.0 4.0 0 0
+ 0.850107 3 1 tcp 40 ----- 0 0.0 4.0 0 0
- 0.850107 3 1 tcp 40 ----- 0 0.0 4.0 0 0
r 1.00094 3 1 tcp 40 ----- 0 0.0 4.0 0 0
+ 1.00094 1 2 tcp 40 ----- 0 0.0 4.0 0 0
- 1.00094 1 2 tcp 40 ----- 0 0.0 4.0 0 0
r 1.151773 1 2 tcp 40 ----- 0 0.0 4.0 0 0
+ 1.151773 2 4 tcp 40 ----- 0 0.0 4.0 0 0
- 1.151773 2 4 tcp 40 ----- 0 0.0 4.0 0 0
r 1.16188 2 4 tcp 40 ----- 0 0.0 4.0 0 0
+ 1.16188 4 2 ack 40 ----- 0 4.0 0.0 0 1
- 1.16188 4 2 ack 40 ----- 0 4.0 0.0 0 1
r 1.171987 4 2 ack 40 ----- 0 4.0 0.0 0 1
+ 1.171987 2 1 ack 40 ----- 0 4.0 0.0 0 1
- 1.171987 2 1 ack 40 ----- 0 4.0 0.0 0 1
r 1.32282 2 1 ack 40 ----- 0 4.0 0.0 0 1
+ 1.32282 1 3 ack 40 ----- 0 4.0 0.0 0 1
- 1.32282 1 3 ack 40 ----- 0 4.0 0.0 0 1
r 1.473653 1 3 ack 40 ----- 0 4.0 0.0 0 1
+ 1.473653 3 0 ack 40 ----- 0 4.0 0.0 0 1
- 1.473653 3 0 ack 40 ----- 0 4.0 0.0 0 1
r 1.52376 3 0 ack 40 ----- 0 4.0 0.0 0 1
+ 1.52376 0 3 tcp 1040 ----- 0 0.0 4.0 1 2
- 1.52376 0 3 tcp 1040 ----- 0 0.0 4.0 1 2
+ 1.52376 0 3 tcp 1040 ----- 0 0.0 4.0 2 3
- 1.526533 0 3 tcp 1040 ----- 0 0.0 4.0 2 3
r 1.576533 0 3 tcp 1040 ----- 0 0.0 4.0 1 2
+ 1.576533 3 1 tcp 1040 ----- 0 0.0 4.0 1 2
- 1.576533 3 1 tcp 1040 ----- 0 0.0 4.0 1 2
r 1.579307 0 3 tcp 1040 ----- 0 0.0 4.0 2 3
+ 1.579307 3 1 tcp 1040 ----- 0 0.0 4.0 2 3
- 1.5982 3 1 tcp 1040 ----- 0 0.0 4.0 2 3
r 1.7482 3 1 tcp 1040 ----- 0 0.0 4.0 1 2
+ 1.7482 1 2 tcp 1040 ----- 0 0.0 4.0 1 2
- 1.7482 1 2 tcp 1040 ----- 0 0.0 4.0 1 2
```

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