#PART A: MLab6.tcl:Implement and study the performance of CDMA on NS2/NS3(Using stack called Call net)or equivalent environment

```
#set  parameters
 set stop 100                    ;# Stop time.

 # Topology
 set type umts ;#type of link


 # AQM parameters
 set minth 30
 set maxth 0
 set adaptive 1 ;# 1 for Adaptive RED, 0 for plain RED


 # Traffic generation.
 set flows 0 ;# number of long-lived TCP flows
 set window 30 ;# window for long-lived traffic

 # Plotting statics.
 set opt(wrap) 100 ;# wrap plots?
 set opt(srcTrace) is ;# where to plot traffic
 set opt(dstTrace) bs2 ;# where to plot traffic

 #default downlink bandwidth in bps
 set bwDL(umts) 384000


 #default downlink propagation delay in seconds
 set propDL(umts) .150


 set ns [new Simulator]

 set tf [open Mlab6.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 " umts 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
 }

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

 #Create topology
 switch $type {
 umts {cell_topo}
 }


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

 # Set up forward TCP connection
 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 "Mlab6.tr"

 set GETRC "/var/cn/ns-allinone-2.35/ns-2.35/bin/getrc"
 set RAW2XG "/var/cn/ns-allinone-2.35/ns-2.35/bin/raw2xg"
```

```
  exec $GETRC -s $sid -d $did -f 0 Mlab6.tr | \
  $RAW2XG -s 0.01 -m $wrap -r > plot6.xgr

  exec $GETRC -s $did -d $sid -f 0 Mlab6.tr | \
  $RAW2XG -a -s 0.01 -m $wrap >> plot6.xgr

  exec xgraph -x time -y packets plot6.xgr &
  exit 0
  }
  $ns at $stop "stop"
$ns run
```