

OpenSees & Output

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Output Options

When you run OpenSees **THERE IS NO OUTPUT PROVIDED
UNLESS YOU REQUEST IT**

3 ways to obtain output:

1. **puts** command

puts <\$fileID> \$string

2. **print** command

print <-file \$fileName> <-node \$nd1 \$nd2 ..> <-ele \$ele1 \$ele2 ...>

3. **recorder** command

recorder \$type \$arg1 \$arg2 ...

Commands That Return Values (2):

- analyze command `set ok [analyze numIter < Δt >]`
- getTime command `set currentTime [getTime]`
- nodeDisp command `set disp [nodeDisp $node <$dof>]`
- nodeVel command `set vel [nodeVel $node <$dof>]`
- nodeAccel command `set acc [nodeAccel $node <$dof>]`
- nodeEigen command `set eig [nodeEigen $node <$dof>]`
- eleResponse command `set resp [eleResponse $eleTag $arg1 $arg2 ...]`

Example using puts (sdofExample1.tcl)

```
# create model & analysis
...

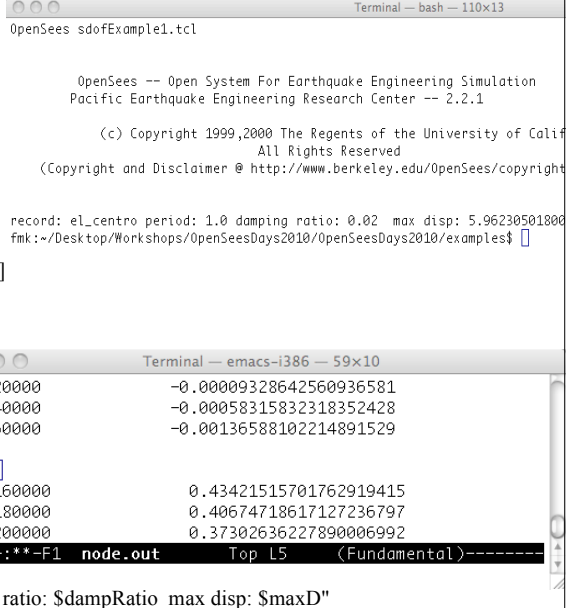
# open output file
set nodeOut [open node.out w]
set forceOut [open ele.out w]

#perform analysis
while {$ok == 0 && $t < $maxT} {
  set ok [analyze 1 $dT]
  set time [getTime]
  set d [nodeDisp 2 1]
  set forces [eleResponse 1 material stress]
  puts $nodeOut "$time $d"
  puts $forceOut "$time $forces"

  if {$d > $maxD} {
    set maxD $d
  } elseif {$d < [expr -$maxD]} {
    set maxD [expr -$d]
  }
  set t [expr $t + $dT]
}

#close the files
close $nodeOut
close $forceOut

puts "record: $record period: $Tn damping ratio: $dampRatio max disp: $maxD"
```



```
Terminal — bash — 110x13
OpenSees sdofExample1.tcl

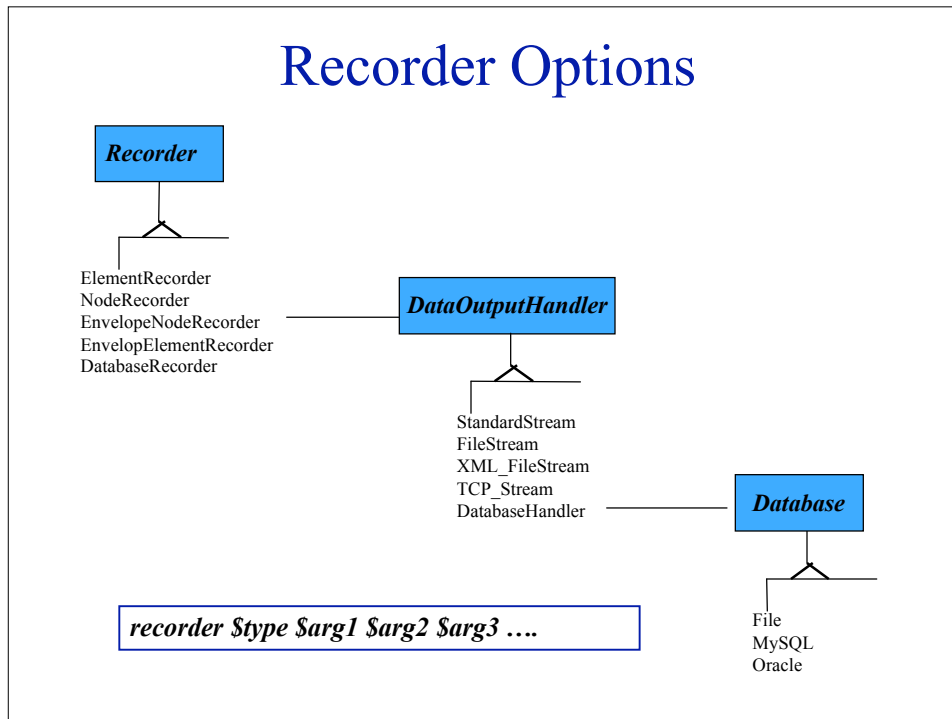
OpenSees -- Open System For Earthquake Engineering Simulation
Pacific Earthquake Engineering Research Center -- 2.2.1

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record: el_centro period: 1.0 damping ratio: 0.02 max disp: 5.96230501800
fmk:~/Desktop/Workshops/OpenSeesDays2010/OpenSeesDays2010/examples$

Terminal — emacs-i386 — 59x10
0.020000 -0.00009328642560936581
0.040000 -0.00058315832318352428
0.060000 -0.00136588102214891529
...
31.160000 0.43421515701762919415
31.180000 0.40674718617127236797
31.200000 0.37302636227890006992
-uu-:*-F1 node.out Top L5 (Fundamental)-----
```

Recorder Options



Element/EnvelopeElement Recorders

- To monitor what's happening in the elements.

```

recorder Element <-file $fileName> <-time> <-ele $stg1 $stg2 ...> $arg1 $arg2 ...
                <-xml $fileName> <-eleRange $stgS $stgE>
                <-binary $fileName> <-region $rTag>
                <-tcp $inetAddr>
  
```

- The response you can ask vary from element to element. There are of course some each element will respond to, e.g. forces.

```
recorder Element -file ele.out -ele 1 2 forces
```

```
recorder Element -file ele1sect1fiber1.out -ele 1 2 section 1 fiber 1stress
```

- The EnvelopeElement takes exactly same args

```

recorder EnvelopeElement <-file $fileName> <-time> <-ele $stg1 $stg2 ...> $arg1 $arg2 ...
                        <-xml $fileName> <-eleRange $stgS $stgE>
                        <-binary $fileName> <-region $rTag>
                        <-tcp $inetAddr>
  
```

Node/EnvelopeNode Recorders

- To monitor what's happening at the Nodes.

```

recorder Node <-file $fileName><-timeSeries $tsTag> <-time> <-node $stg1 $stg2 ...> -dof $d1 $d2 .. disp
                <-xml $fileName>                                <-nodeRange $stgS $stgE>                vel
                <-binary $fileName>                            <-region $rTag>                    accel
                <-tcp $inetAddr>                                <-region $rTag>                    incrDisp
                                                                    reaction
    
```

Example:

```
recorder Node -file nodeD.out -node 2 -dof 1 2 3 disp
```

```
recorder Node -file nodeA.out -timeSeries 1 -node 2 -dof 1 accel
```

```

recorder EnvelopeNode <-file $fileName><-timeSeries $tsTag> <-time> <-node $stg1 $stg2 ...> -dof $d1 $d2 .. disp
                <-xml $fileName>                                <-nodeRange $stgS $stgE>                vel
                <-binary $fileName>                            <-region $rTag>                    accel
                <-tcp $inetAddr>                                <-region $rTag>                    incrDisp
                                                                    reaction
    
```

Example using recorders(sdofExample2.tcl)

```
# create model & analysis
```

```
...
```

```
#create recorders
```

```
recorder Node -file node1.out -time -node 2 -dof 1 disp
recorder Element -file ele1.out -time -ele 1 material stress
```

```
#perform analysis
```

```

while {$ok == 0 && $t < $maxT} {
  set ok [analyze 1 $dT]
  set time [getTime]
  set d [nodeDisp 2 1]
  if {$d > $maxD} {
    set maxD $d
  } elseif {$d < [expr -$maxD]} {
    set maxD [expr -$d]
  }
  set t [expr $t + $dT]
}
    
```

```
puts "record: $record period: $Tn damping ratio: $dampRatio"
wipe
```

The screenshot shows a terminal window with the following content:

```

Terminal -- bash -- 81x13
OpenSees sdofExample2.tcl

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record: el_centro period: 1.0 damping ratio: 0.02 max disp: 5.962305018001343
fmk: ~/Desktop/Workshops/OpenSeesDays2010/OpenSeesDays2010/examples$

Terminal -- emacs-i386 -- 46x12
0.02 -9.32864e-05
0.04 -0.000583158
0.06 -0.00136588
0.08 -0.00278162
...
31.16 0.434215
31.18 0.406747
31.2 0.373026
31.22 0.333614
=uu-:**F1 node1.out All L6 <Fundame
    
```

```
Terminal — emacs-i386 — 59x10
0.020000      -0.00009328642560936581
0.040000      -0.00058315832318352428
0.060000      -0.00136588102214891529
...
...
31.160000      0.43421515701762919415
31.180000      0.40674718617127236797
31.200000      0.37302636227890006992
-uu-:*-F1 node.out Top L5 (Fundamental)-----

Terminal — emacs-i386 — 46x12
0.02 -9.32864e-05
0.04 -0.000583158
0.06 -0.00136588
0.08 -0.00278162
...
...
31.16 0.434215
31.18 0.406747
31.2 0.373026
31.22 0.333614
-uu-:*-F1 node1.out All L6 (Fundame
```

Any Questions?