OpenSees

OpenSees & Output

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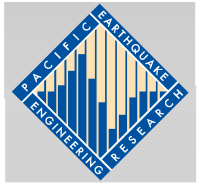
UC Berkeley

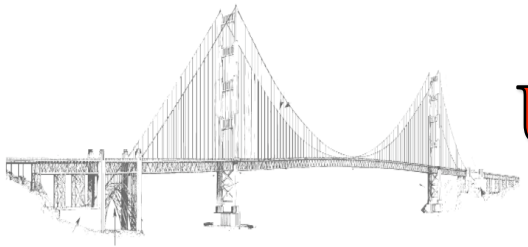
OpenSees Days 2013



Output Options

When you run OpenSees:

Input



No OUTPUT
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
```

```
Terminal — bash — 110×13
OpenSees sdofExample1.tcl


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

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                                All Rights Reserved
    (Copyright and Disclaimer @ http://www.berkeley.edu/OpenSees/copyright


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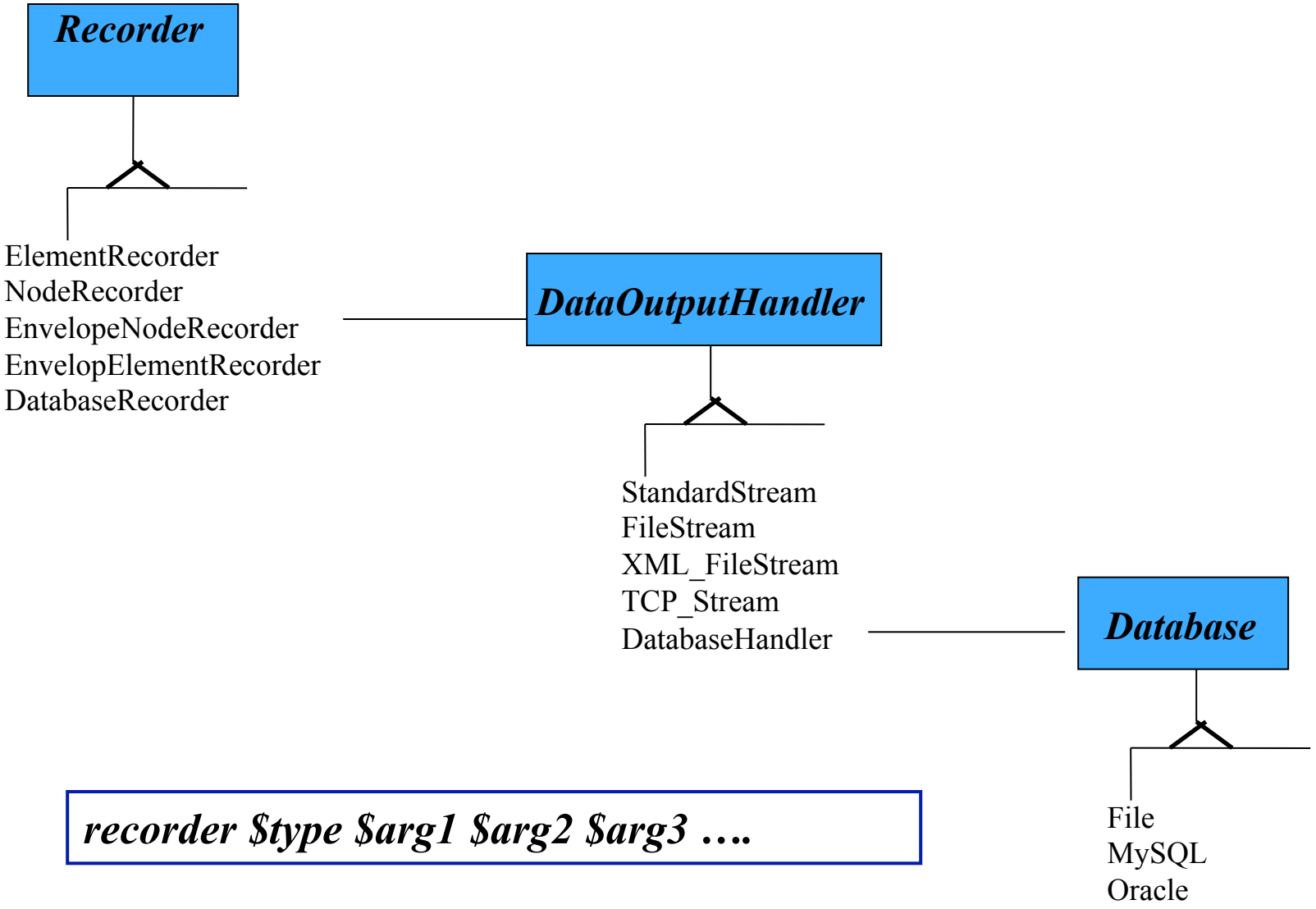

```
Terminal — emacs-i386 — 59×10
0.020000              -0.00009328642560936581
0.040000              -0.0005831583231835242 8
0.060000              -0.0013658810221489152 9
...
...
31.160000               0.43421515701762919415
31.180000               0.40674718617127236797
31.200000               0.37302636227890006992
-uu-:**-F1  node.out       Top L5     (Fundamental)--------
```

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

Recorder Options



recorder $type $arg1 $arg2 $arg3 ….

Element/EnvelopeElement Recorders

- To monitor what's happening in the elements.

recorder Element ***<-file $fileName>*** ***<-time>*** ***<-ele $tg1 $tg2 …>*** ***$arg1 $arg2 …***
<-xml $fileName> ***<-eleRange $tgS $tgE>***
<-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 $tg1 $tg2 …>*** ***$arg1 $arg2 …***
<-xml $fileName> ***<-eleRange $tgS $tgE>***
<-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 $tg1 $tg2 …> -dof $d1 $d2 .. disp
<-xml $fileName> <-nodeRange $tgS $tgE> vel
<-binary $fileName> <-region $rTag> accel
<-tcp $inetAddr> incrDisp
reaction

Example:

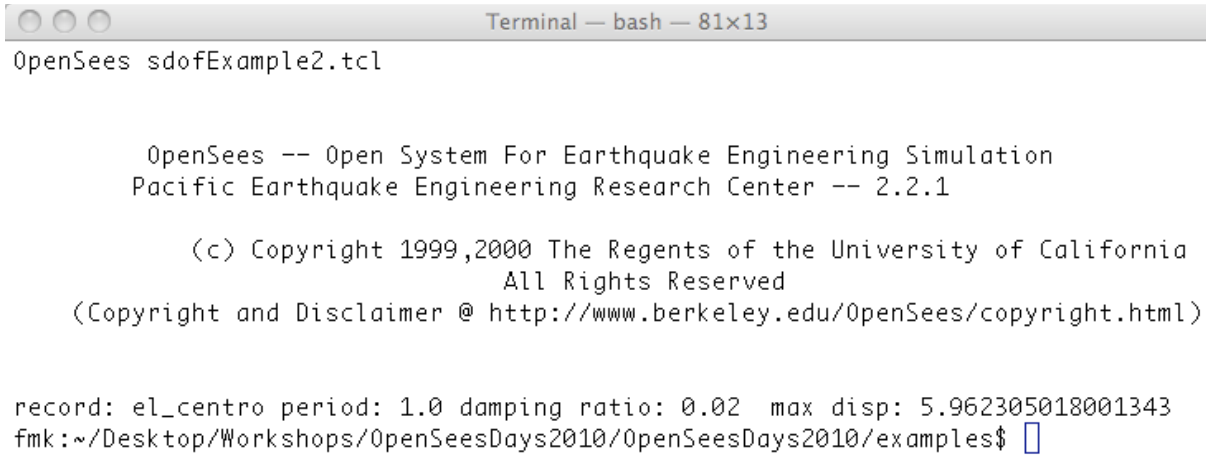
recorder Node -file nodeD.out -node 2 -dof 1 2 3 disp

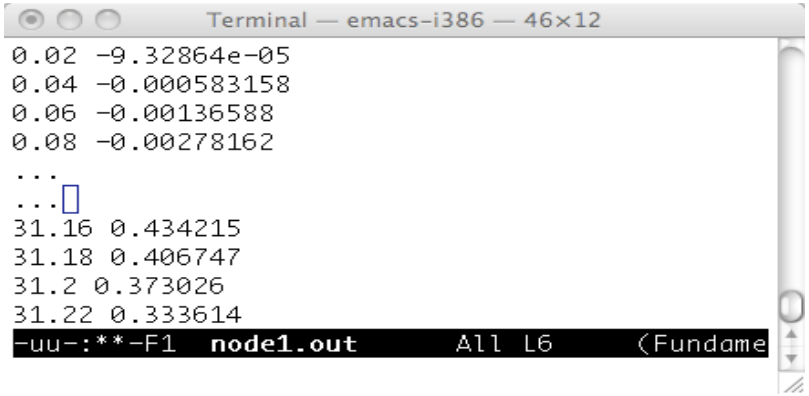
recorder Node -file nodeA.out -temeSeries 1 -node 2 -dof 1 accel

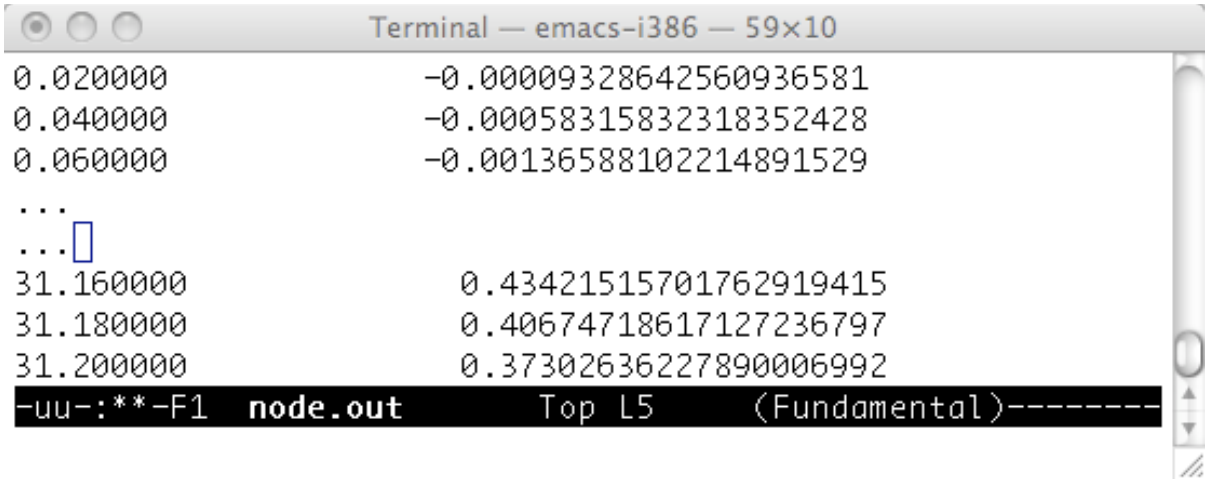
recorder EnvelopeNode <-file $fileName><-timeSeries $tsTag> <-time> <-node $tg1 $tg2 …> -dof $d1 $d2 .. disp
<-xml $fileName> <-nodeRange $tgS $tgE> vel
<-binary $fileName> <-region $rTag> accel
<-tcp $inetAddr> incrDisp
reaction

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
```



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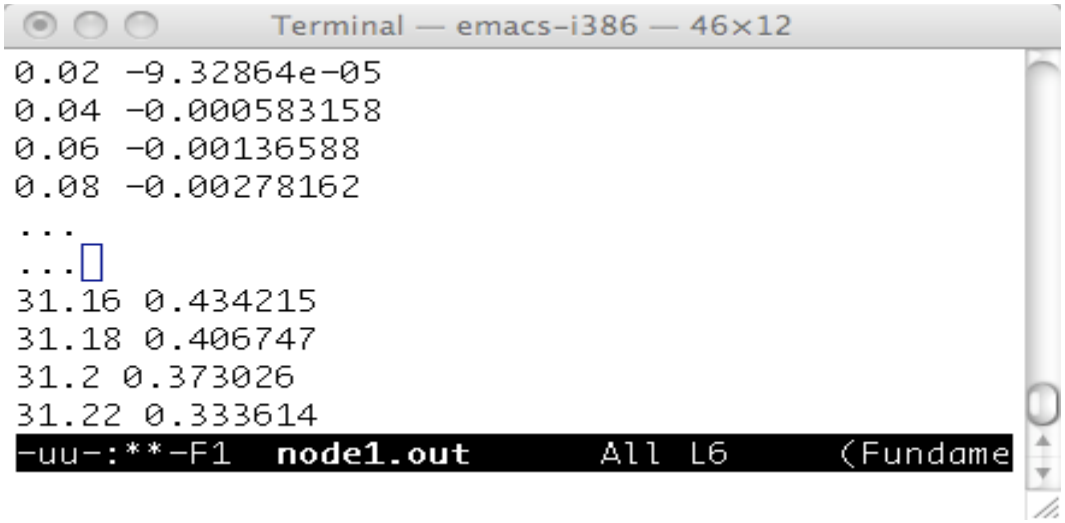
0.020000 -0.00009328642560936581
0.040000 -0.0005831583231835242 8
0.060000 -0.0013658810221489152 9
...
...
31.160000 0.43421515701762919415
31.180000 0.40674718617127236797
31.200000 0.37302636227890006992
-uu-:**-F1 node.out Top L5 (Fundamental)--------


Terminal — emacs-i386 — 46×12
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?