Performance Profiling Using NetBeans Profiler

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Topics

- CPU Profiling
- NetBeans Profiler
  - Profiling schemes
  - Profiling points
  - Monitoring threads status
  - Identifying performance bottlenecks

CPU Profiling

What is CPU Profiling?

- CPU profiling provides information about where an application is spending most of its time
  - Execution performance profiling
- When is CPU profiling needed or beneficial?
  - Poor application throughput measured against a predetermined target
  - Saturated cpu utilization
  - High sys or kernel cpu utilization
  - High lock contention
  - To a lesser extent, poor application scalability

CPU Profiling Strategies

- Some profilers such as NetBeans Profiler allows you profile a subset of an application.
  - Approach can be useful when profiling the entire application is very intrusive or severely disturbs application's performance
  - Profile from a large suspected area of your application then drill down
- DTrace scripts can also be effective
  - Supported on Solaris, some Linux, Mac OS 10.5+ "Leopard"

NetBeans Profiler

Profiling Schemes

- Two schemes
  - Sampling
  - Instrumentation – “all methods” vs “root methods”
- Sampling
  - Lower overhead
  - Profiler performs sampling periodically
  - Less precise than instrumentation
- Instrumentation
  - Methods of the profiled application are instrumented
  - “All methods” - all methods are instrumented
  - “Root method” - only selected root methods are instrumented – less overhead than “All methods”

Profiling Filter

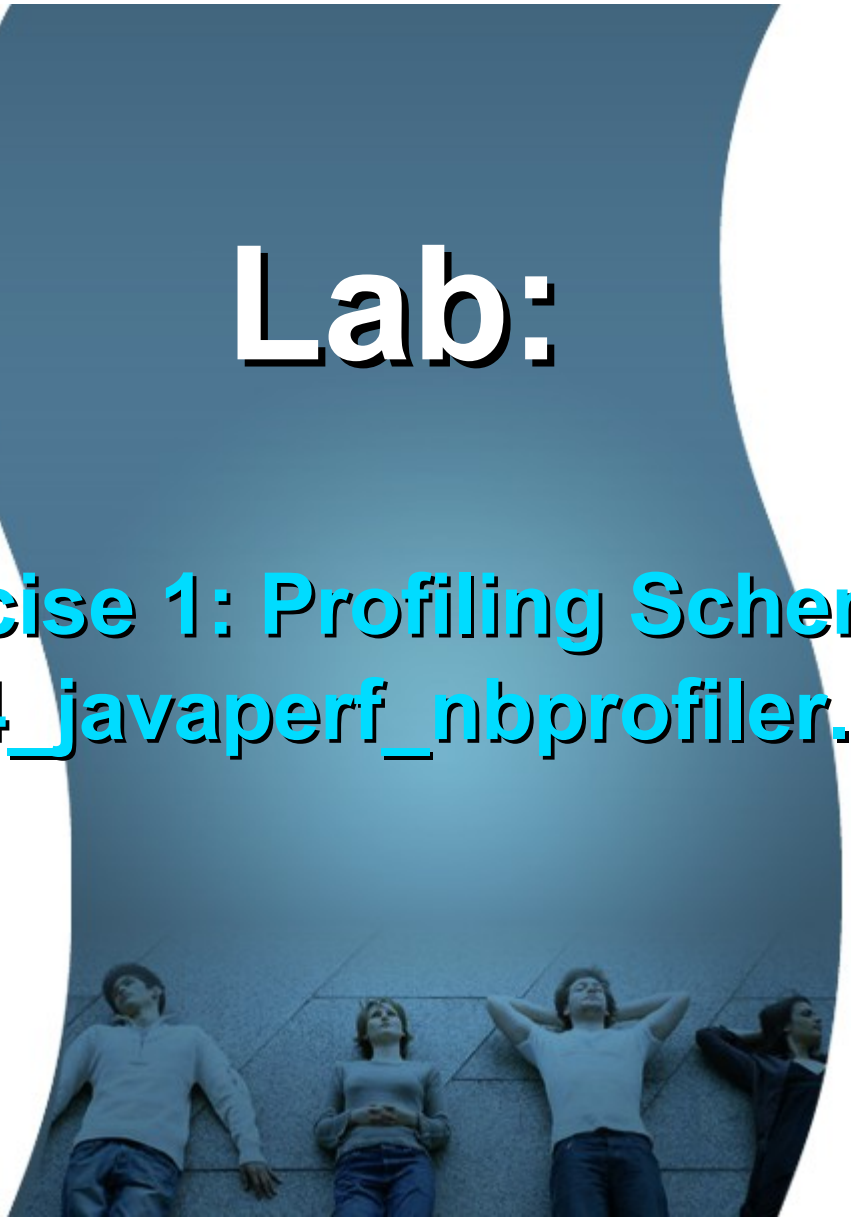
- You can also set a filter to limit the classes that are profiled and control the overhead
- Built-in filters
  - Profile all classes (higher overhead, too much info)
  - Profile only project classes (use root method)
  - Profile project and subproject classes
  - Quick filter – create your own filter
  - Exclude Java Core Classes

Recommendation

- Detect suspected area using “Sampling” first
- Then use Instrumentation scheme in smaller area
- Use root method and/or filter to further refine the profiling

Lab:

Exercise 1: Profiling Schemes
5114_javaperf_nbprofiler.zip

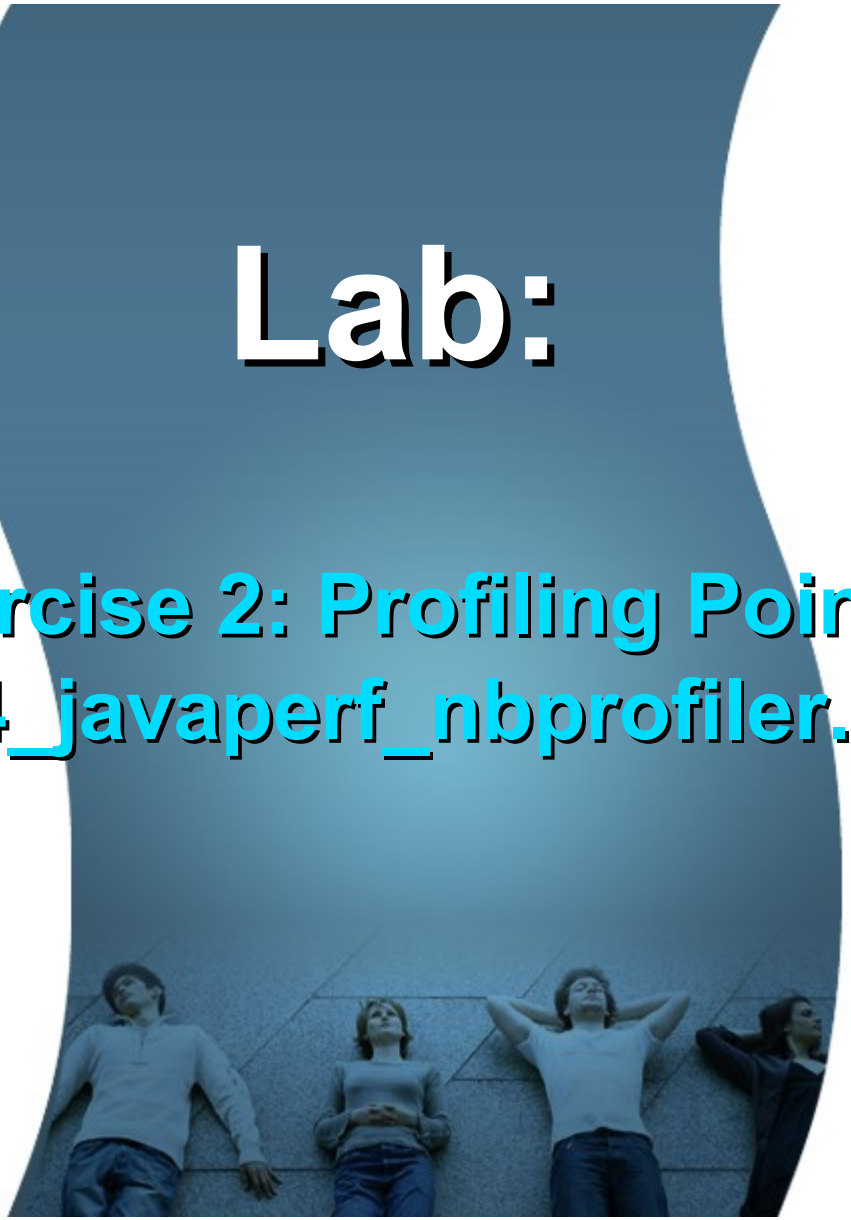


Profiling Points

- You can set profiling points in your source code to more precisely control the collection of profiling results
  - Similar to debugger breakpoints, Profiling points trigger actions when certain trigger conditions occur
- Trigger conditions
  - Execution of a line of code
  - Time elapsed
  - Memory used
- Trigger actions
  - Create heap dumps
  - Reset results collected
  - Run load generator script
  - Take results snapshot

Lab:

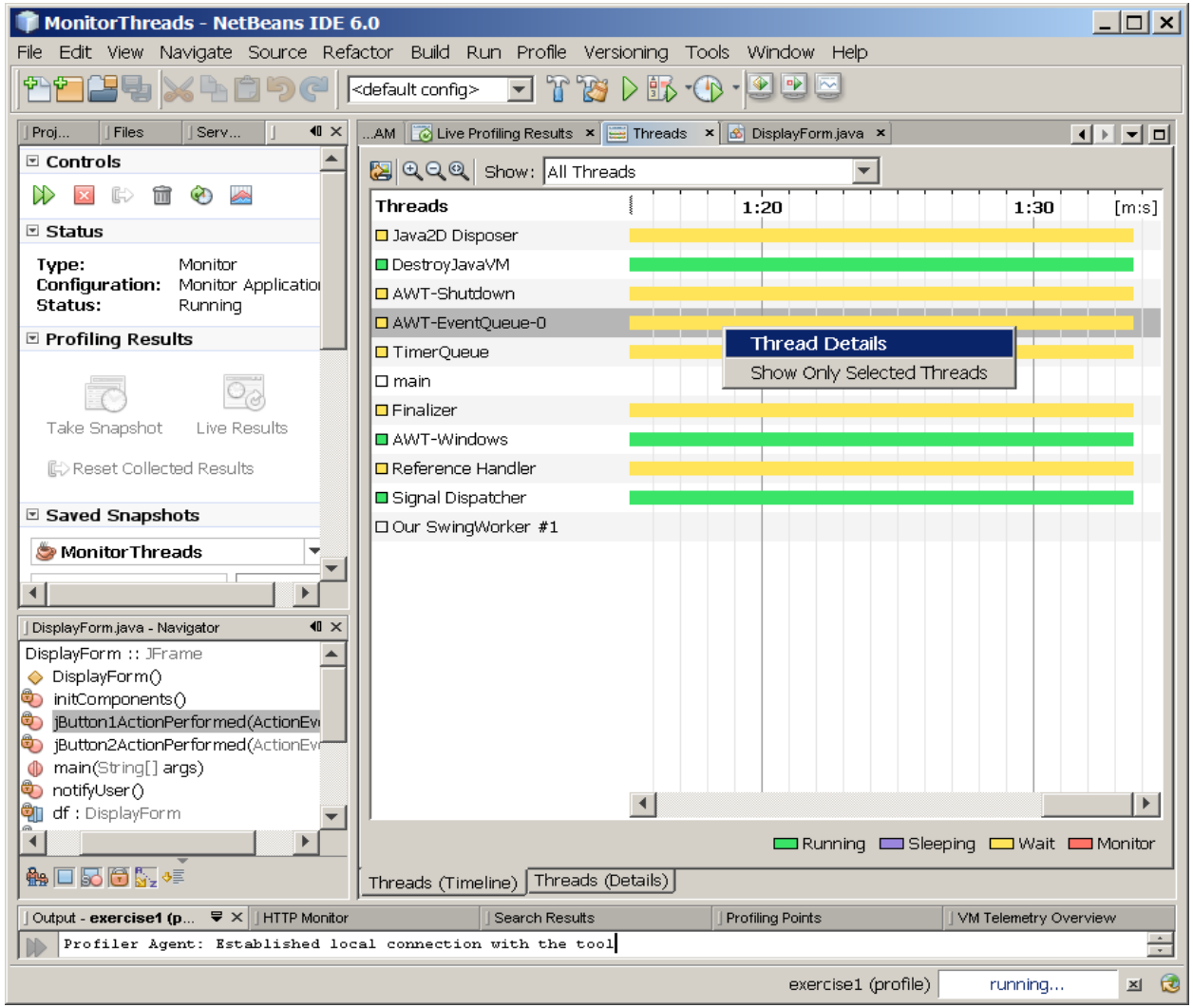
Exercise 2: Profiling Points
5114_javaperf_nbprofiler.zip



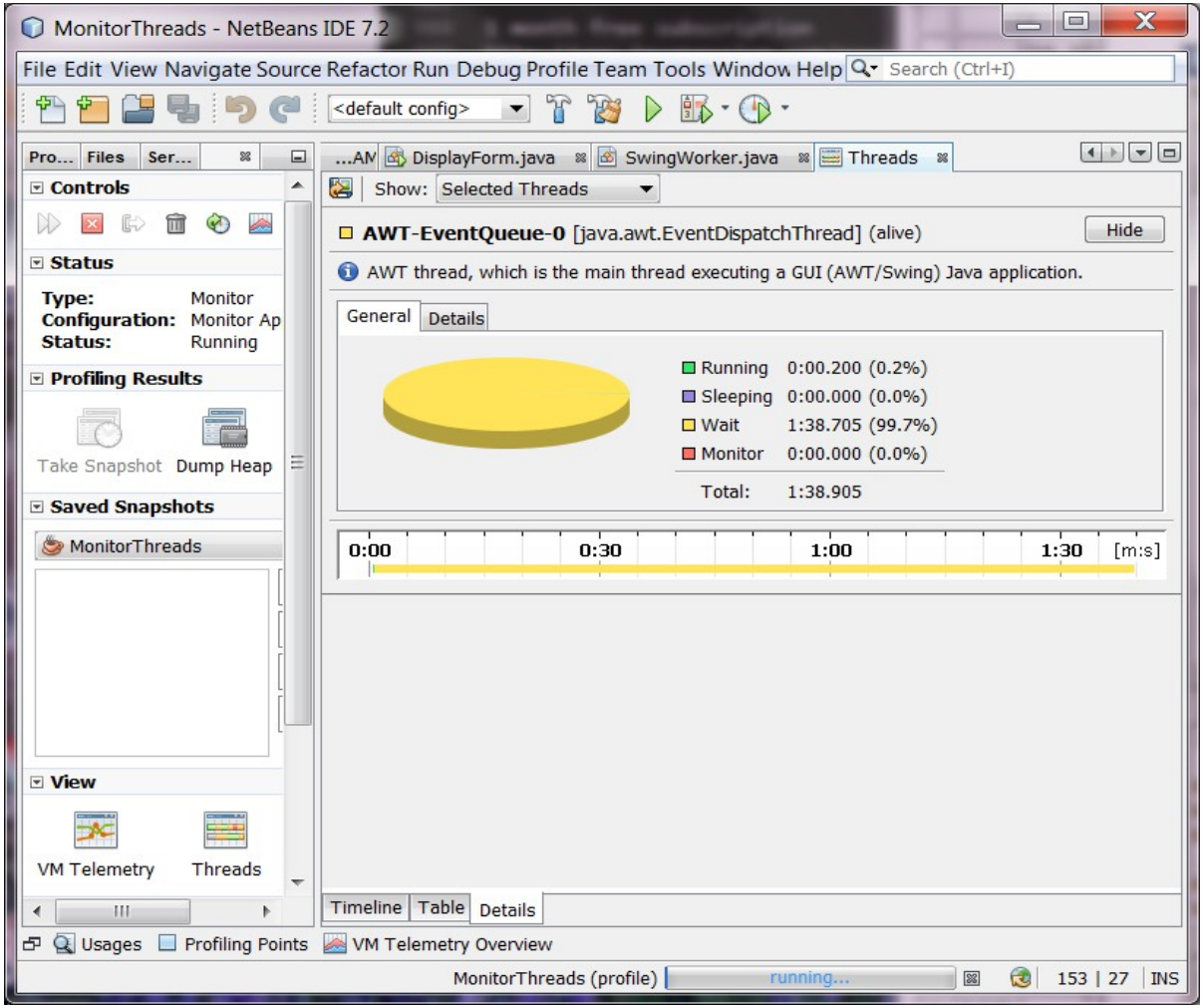
Monitoring Threads Status

- On the Threads Timeline, the NetBeans profiler displays the current and past status of all threads in an application.
- Thread Details give you detailed information about one or more selected threads, including a list of all state changes in the thread life.

Threads Timeline



Thread Detail



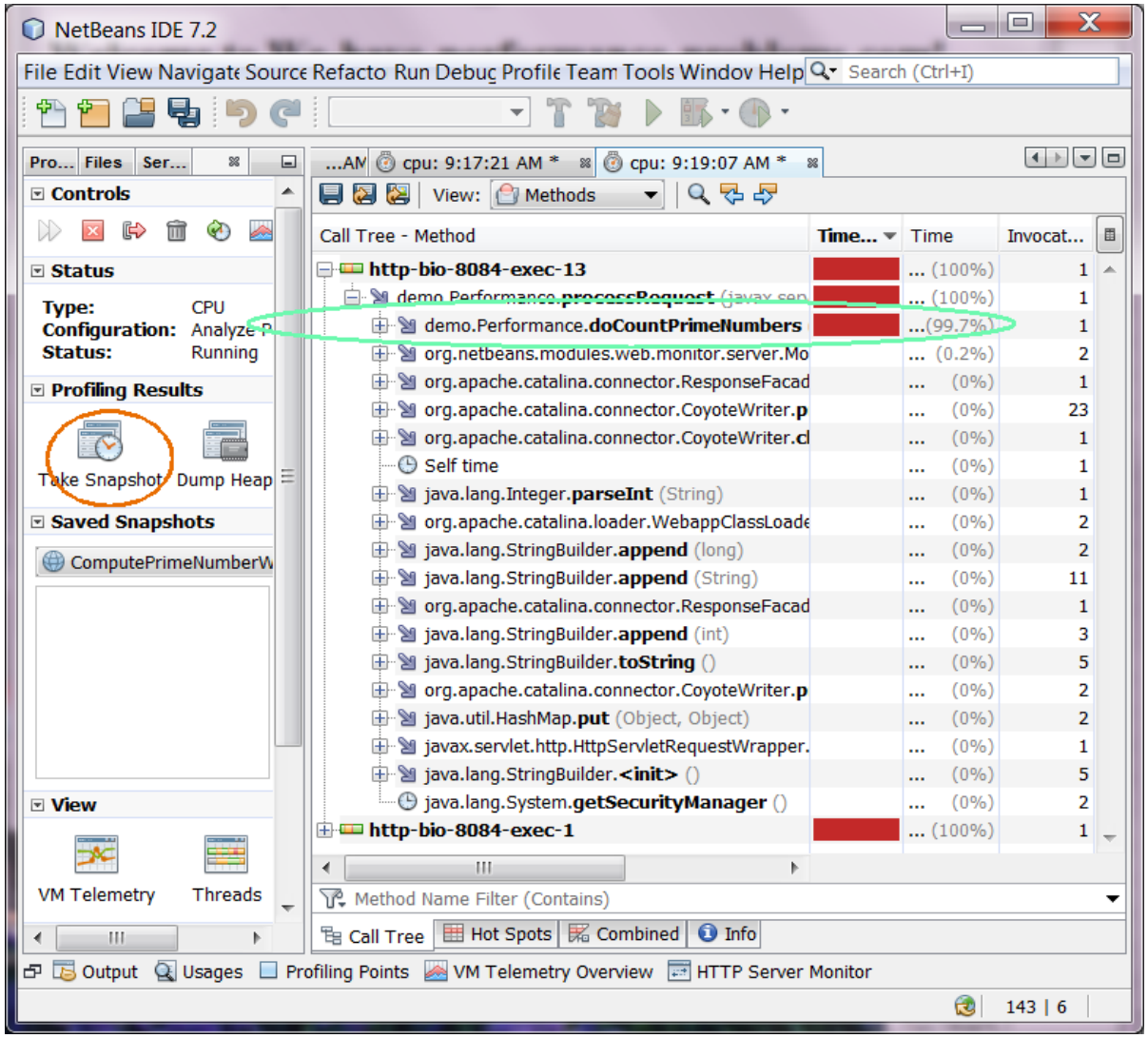
Lab:

Exercise 3: Monitoring Thread Status
5114_javaperf_nbprofiler.zip

Identifying CPU Bottlenecks

- Can be set up to report only on particular methods or the entire application.
- A graph categorizes where CPU time has been spent.
- Click on the graph sections to drill down from high-level categories to more detailed profiling information.
- You can do load testing by starting JMeter scripts at the beginning of a profiling session.

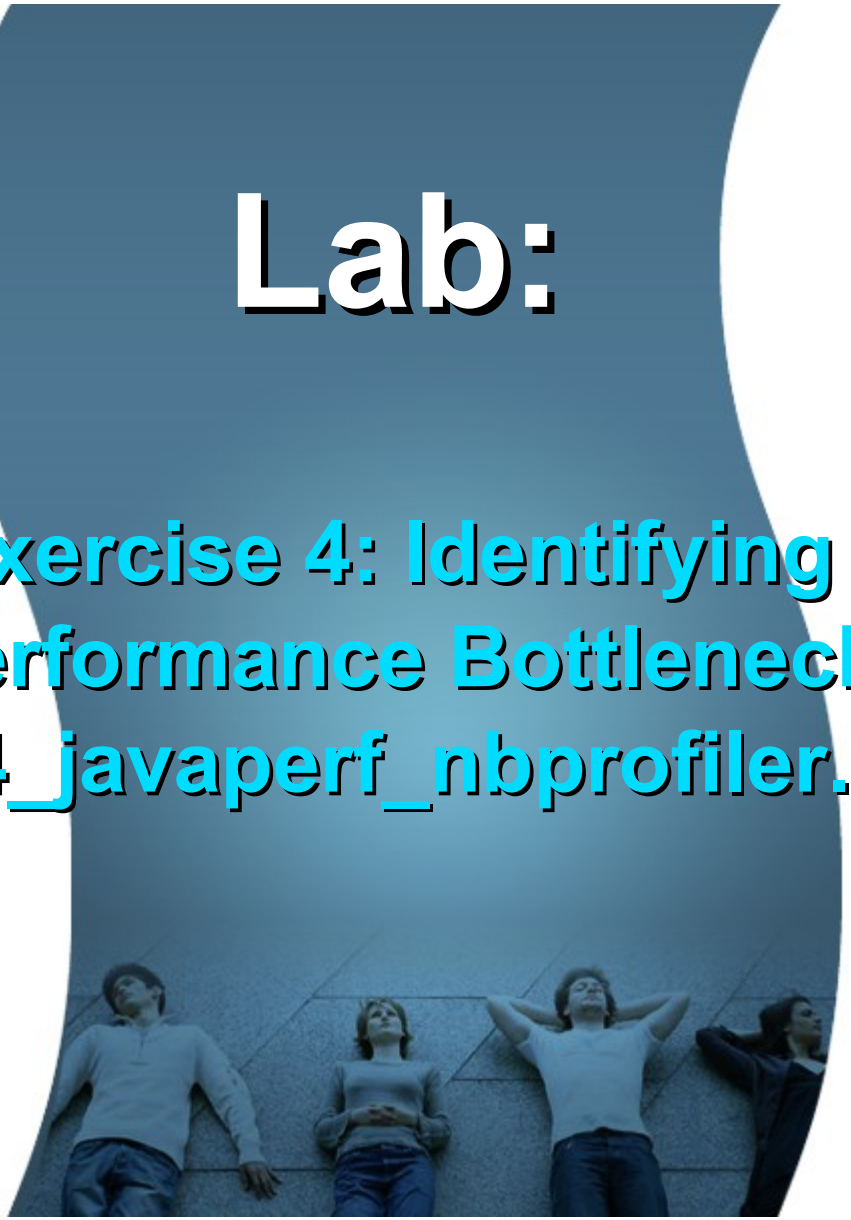
CPU Profiling



Lab:

Exercise 4: Identifying Performance Bottleneck

5114_javaperf_nbprofiler.zip



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