Pleasures and Pitfalls of Profiling

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What? When? How?
What Is profiling?

• A form of dynamic analysis that measures some aspect of the program execution, typically:
  – Memory usage
  – Resource usage
  – Frequency and duration of function calls
“We should forget about small efficiencies, say about 97% of the time: premature optimization is the root of all evil. Yet we should not pass up our opportunities in that critical 3%.”

-Donald Knuth
• “Optimization by guesswork” – bad!
• Hardcoded time measurement and logging
• Profilers
• Sampling (statistical)
• Instrumenting
  – Source instrumenting
  – Code instrumenting
• (Event based)
• (Hypervisor)
Tools
• smartbear.com/products/development-tools/performance-profiling/
• Delphi, C++ Builder, .NET (incl. Silverlight), Java …
• Integration with RAD Studio and Visual Studio – D2006 and newer
• 32- and 64- bit
• Comes with XE and XE2 (limited version)
• $ 599
• Performance profiler
• Allocation (memory) profiler
• Coverage profiler
• Static analysis profiler
• Load library tracer profiler
• More …
• www.prodelphi.de
• Delphi 5 – XE2
• 32- and 64- bit
• Very precise profiling
• Free version (20 procedures)
• Separate Ansi and Unicode version
• Separate 32- and 64- bit version
• 50 – 90 €
• delphitools.info/samplingprofiler
• Delphi 5 – XE (officially), works with XE2
• Measures time spent in OS DLLs
• Works at line level
• Real-time monitor
• Free
• Home-brewed timing and logging
• GetTickCount
• Now
• timeGetTime
• QueryPerformanceCounter
• RDTSC
Fixing performance problems
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- Better algorithm 😊
  - Less memory allocations
  - Less string manipulations
  - Using different Windows controls
- Faster code 😞
  - Code optimization
  - Handcrafted assembler; using MMX/SSE
- Assembler tricks will not make up for bad design, however, they can make good design go faster.
• Distributed algorithms (GUI, messaging) are hard to profile
• Optimizing the inner code of an infinite loop doesn’t help
• If time is spent in kernel, reason may be hard to find
Hands-on!