FastMM in Depth

ITDevCon
Delphi European Conference

Primož Gabrijelčič, primoz@gabrijelcic.org
www.thedelphigeek.com

November 17/18/19 '10 VERONA

bit Time

Memory Management

ITDevCon

Memory Management

"Do I really have to know anything about memory management?"

No!

Unless you live in the real world ☹

Behind the Scene

A simple program …

```
a := 'The answer is';
a := a + ' ' + IntToStr(42);
```

… causes not so simple flow of events.

Allocate, Release

- Allocate
  - TClass.Create, GetMem, AllocateMem, New, Create[Window,Handle,File…]
- Release
  - object.Destroy/Free, FreeMem, Dispose, CloseHandle
  - Or in Delphi terms: Create, GetMem, AllocateMem …; Destroy, Free, FreeMem
- .NET is different

Memory Manager

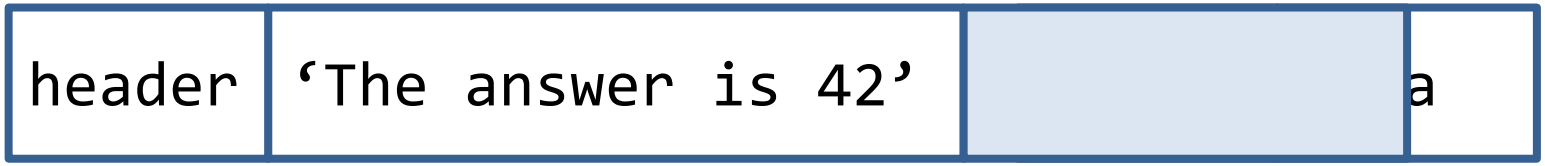
- In the operating system
- In the runtime library
  - Intermediary between the application and OS

- Speed
- Decreased fragmentation

Bugs, Bugs, Everywhere

- Reading outside allocated area

- Writing outside allocated area



- Using released memory

FastMM 4

ITDevCon

FastMM4

- The Fastcode Project Memory Manager Challenge
- Pierre le Riche, fastmm.sourceforge.net
- Included in Delphi 2006
- Supports Delphi 4⇨, C++ Builder 4⇨, Kylix 3

Delphi MM vs. FastMM4

	Delphi MM	FastMM4
Speed	✓	✓✓
Fragmentation	✓	✓✓
Debugging	✗	✓✓
Simplicity	✓	✓✓

- `Uses FastMM4;`

FastMM4 Internals

- Three memory managers in one
  - **Small blocks** (< 2,5 KB)
    - Most frequently used (99%)
    - Medium blocks, subdivided into small blocks
  - **Medium blocks** (2,5 – 260 KB)
    - Allocated in chunks (1,25 MB) and subdivided into lists
  - **Large blocks** (> 260 KB)
    - Allocated directly by the OS
  - Separate locks

Other Memory Managers

- TopMM
  - www.topsoftwaresite.nl
  - Multithreaded programming
- SafeMM
  - cc.embarcadero.com/item/27241
  - Debugging

Show me the code!

Q & A

ITDevCon