TriMedia Optimization Advanced: 4-day class
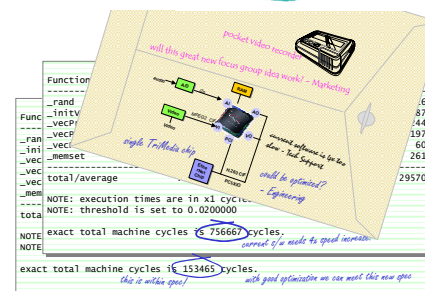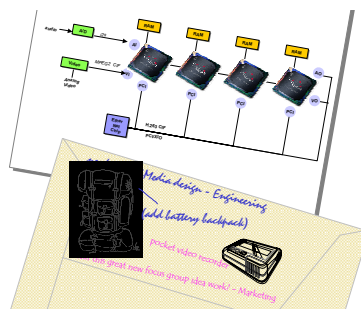
Advanced Class

BORES Signal Processing

Benefits

- Increase program speed
- Manage the cache well
- Reduce program size

Learn advanced optimization techniques and strategies that can work even in difficult cases.

Optimizing: the alternative to bigger hardware

Contents

This class progressively introduces optimization strategies and techniques, illustrating through 'hands-on' exercises. Sessions cover:

Profiling

In-depth profiling to investigate program behaviour. Using this knowledge to guide choice of optimization strategies.

- Registers, cache, parallelism.
- Read and graph dtree code
- Finding inherent parallelism
- Read and use schedule reports
- Profiling to guide optimization
- Using the profiling API
- Verilator for profiling

Optimization strategies

Why and how to choose an optimization strategy. Understanding levels of optimization.

- Increase parallelism
- Reduce memory traffic
- Use the cache efficiently
- Use registers efficiently
- Get more from each issue slot

Compiler optimizations

Compiler optimizations. Using pragmas and separately linked files to tune optimization.

- Unrolling, grafting and inlining
- Profile-driven optimization
- Tuning by independent linking

Increasing parallelism

How to increase parallelism.

- Investigating parallelism in code
- Barriers to parallelism:
- Pointer (and array) aliasing
- Dirty floating point
- Memory latency

Reducing memory traffic

How to eliminate memory accesses.

- Avoiding implied memory loads
- Using packed memory data
- Cache temporal locality
- Cache spatial locality
- Organize data for the cache
- Register-to-register operations
- Monitoring register usage

Custom operations

Progressively discover possibilities to use custom operations.

- SIMD - FIR example
- Pack and merge

More than speed

How to monitor and control code size when optimizing. Effect of optimizations on code size and power consumption.

- Reducing code size
- When not to optimize
- Difficulties with control code
- Optimizing for power consumption

Time and arrangements

This class takes 4 days.

Delegates need to bring their own laptops but software can be provided if needed (most delegates will already have TriMedia software installed).

It is presented 'on-site' by arrangement - the material can be adapted if you have specific needs (at extra cost).

Sometimes we arrange 'public' classes: schedules are posted on the Internet:

http://www.bores.com/schedule.htm

Basic Optimization

We also offer a 1-day Basic Optimization class that is part of the 4-day TriMedia Foundation class.

Booking and questions

Call us by 'phone or send email to book or to ask questions.

- contact: Dr Chris Bore
- 'phone: +44 (0)1483 740138
- mobile: +44 (0)7921 153219
- email: chris@bores.com

Foundation class

The 'TriMedia Foundation' is a 4-day class on all aspects of the TriMedia. It is a good basis to prepare for this advanced class.

We recommend you take the 4-day TriMedia Foundation class before attending this advanced class but if you have a lot of experience with TriMedia then you may be able to cope.