

# Scheduling Multi-Threaded Tasks to Reduce Intra-Task Contention

Corey Tessler

[corey.tessler@wayne.edu](mailto:corey.tessler@wayne.edu)

Nathan Fisher

[fishern@wayne.edu](mailto:fishern@wayne.edu)



Dept. of Computer Science

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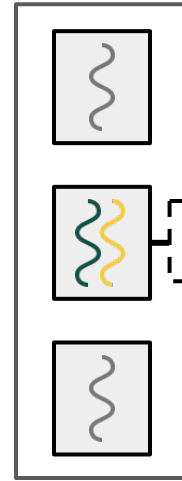
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# Current View: One Thread Per Task



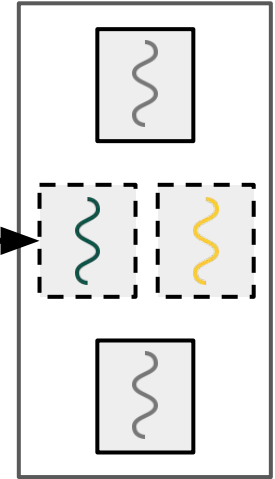
The classical model of hard real-time systems **assumes** each task contains exactly one thread of execution.

Programmer's View



Multi-Threaded  
Tasks

Analytical View



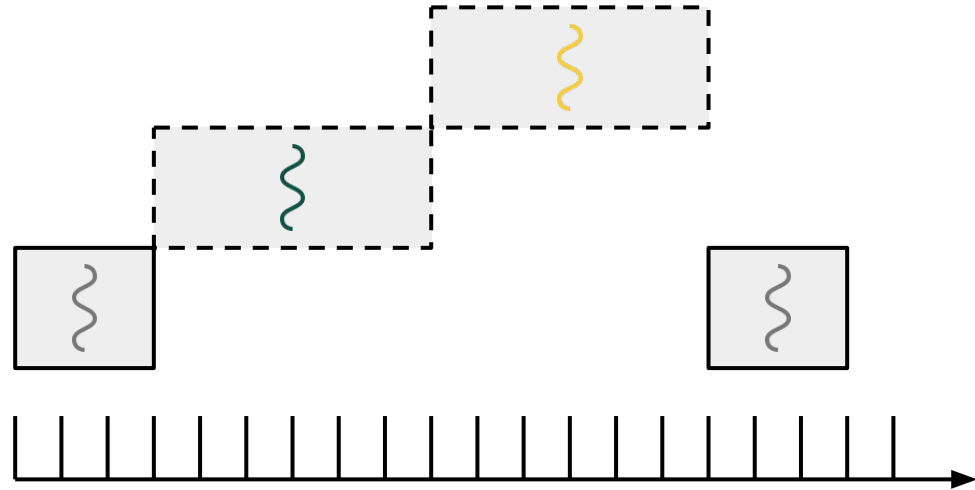
Single-Threaded  
Tasks

Synthesize

# Single-Threaded Analysis



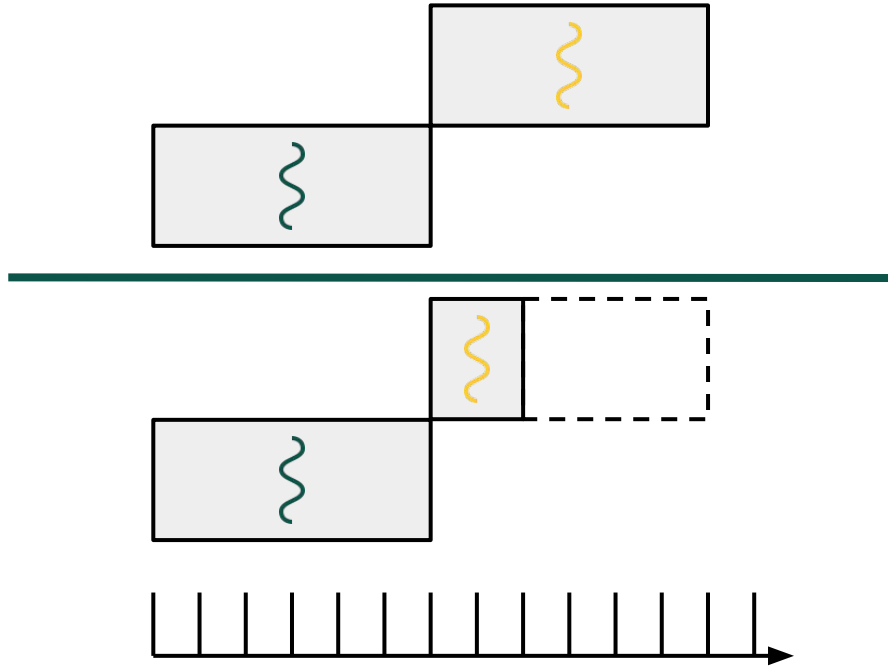
Every single-threaded task impacts schedulability, WCET, and preemption cost analysis **equally** and **independently**.



# An Integrated Positive Perspective



A thread may reduce the execution time of another by unexpectedly placing values in the cache, called the **inter-thread cache benefit**.



# Goals and Obstacles



- Introduce a **positive** perspective on caches.
- Propose an **integrated** scheduling and analysis technique for one multi-threaded task.

- ✓ Scheduler **BUNDLE**
- ✓ Definition and Extraction of **Conflict Free Sub-Graphs**
- ❑ Complete Evaluation