Final Review

Final Exam Info

- Time: Wednesday 5/28 3:30 – 5:30 pm
- Location: Brown Lab 101
- Number of questions?
  - 7-8
- Topics?
  - Lectures
    - Before the midterm (30%)
    - After the midterm (70%)
  - Projects 0~5
- Regular office hours will be held

Course Evaluation Info

- http://www.udel.edu/course-evals/
- Time: 5/14 Wed – 5/20 Tue
- An additional set of questions have been sent through google document.
- Your feedback will be valuable to next year students. We appreciate your contribution.
- If you participate, the weight of your lowest HW score will be reduced by 50%.

Topics before the midterm

Topic	Lecture #
State Machine Review	3
C Review	4
Embedded System Intro	6
C to MIPS, Tool Chain	8
MIPS ISA, Assembly	12, 14-15
Interrupts	16-17
Buses	18-19

Topics after the midterm

Topic	Lecture #
Memory Hierarchy	23-24, 28-29
Sampling and ADC	26
Timer	27
PWM	29
Error Correction Code	30
Embedded system design	33-36
Testing	37-38

Important Concepts

- Please refer to "midterm review" for those important concepts before the midterm
- Memory Hierarchy
  - Principle of Locality
  - Registers, cache(s), main memory, secondary storage
  - SRAM, DRAM, ROM, Flash, disk
  - Cache organization, AMAT, AMAC
- Error detection and correction
  - Hamming distance, code distance
  - Parity code, Hamming code

Important Concepts

- Sampling and ADC
  - Magnitude vs. frequency
  - ADC circuits and scalability
- Timer and PWM
  - Basic activities
  - Setting
  - Waveform

Important Concepts

- Embedded system design
  - Cost vs. Power/Energy vs. Performance
  - Co-design flow
  - Scheduling
- Testing
  - Stuck-at fault model
  - D algorithm

Project Topics

- Code state machines in C
  - Next state logic, output logic…
- Configure the board
  - Input/output ports
  - Interrupts: Change notice, Timer, PWM
  - ADC
- Monitor inputs
  - Debouncing
  - Push buttons, keypads, mic, light sensor
- Drive outputs
  - On board LEDs
  - 7-segment display
  - Servo

LED rotator

Alarm Clock

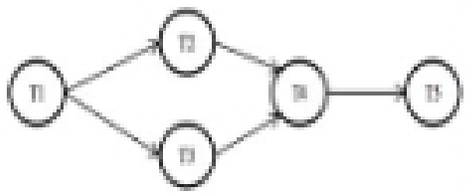
Number Game

New alarm Clock

Robot

Homework Question

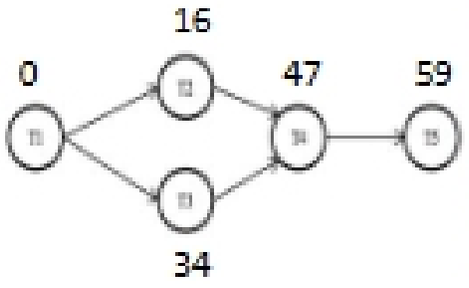
- A task graph consisting of five tasks (T1, T2, T3, T4, T5) and four different hardware implementations (HW1, HW2, HW3, HW4).
- The cost of hardware elements is $20, $16, $14, and $9.
- Task graph has a deadline of 45 seconds.



Tasks	HW1	HW2	HW3	HW4
T1	9	11	-	16
T2	8	15	13	18
T3	12	7	11	13
T4	10	16	7	12
T5	9	8	10	11

Different schedules

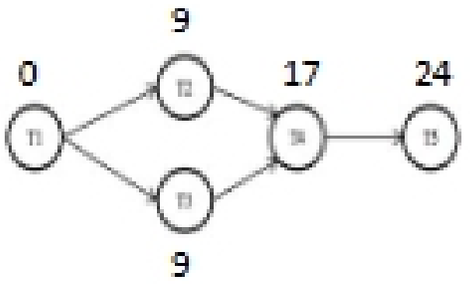
- Minimum cost schedule
  - Cost = $9
  - Execution time = 16+18+13+12+11=70



	$20	$16	$14	$9
Tasks	HW1	HW2	HW3	HW4
T1	9	11	-	16
T2	8	15	13	18
T3	12	7	11	13
T4	10	16	7	12
T5	9	8	10	11

Different schedules

- Minimum execution time schedule
  - Cost = $20 + $16 + $14= $50
  - Execution time = 9+max(8,7)+7+8=32



	$20	$16	$14	$9
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