1/20/15:

Simulative Analysis of a Multidimensional Torus-based Reconfigurable Cluster for Molecular Dynamics

1. Briefly describe molecular dynamics (MD) its main purpose?
2. Why is reconfigurable cluster superior to an ASIC computing machine with respect to molecular dynamics?
3. Briefly describe the 3D Torus topology and give two advantages of using this topology.

CSP: A multifaceted Hybrid Architecture for Space Computing

4. What is the downside of using an all-COTS (Commercial off the shelf) hardware platform in space?
5. What are two disadvantages of using an all-RadHard (Radiation Hardened) hardware platform in space?
6. Why is high performance computing necessary in space?

1/22/15:

Opportunities and Challenges of Wireless Sensor Networks Using Cloud Services
Managing Wearable Sensor Data through Cloud Computing

7. What are the three categories of cloud computing services?
8. Discuss the maintenance dilemmas that arise when leveraging cloud computing to WSNs?
9. Discuss two of the four major challenges faced by WSNs that are alleviated by using cloud computing?

1/27/15:

A Framework to Analyze Processor Architectures for Next-Generation On-Board Space Computing
Comparative Analysis of HPC and Accelerator Devices: Computation, Memory, I/O, and Power

10. Assuming Processor A that can perform 20 GOPS (billions of operations per second) while consuming 20 W power and Processor B that can perform 100 GOPS while consuming 50W of power, which processor is more energy efficient in terms of performance?
11. Based on research at CHREC, it was found that benchmark data for Computational Density (CD) was approximately 20% of that estimated by metrics calculations. Give two reasons why this is so.
12. Give one reason why radiation-hardening lowers the performance of a device.

1/29/15:

Implementation of a Reconfigurable Computing System for Space Applications
Decentralized Run-Time Recovery Mechanism for Transient and Permanent Hardware Faults for Space-borne FPGA-based Computing Systems

13. Why is it important to protect from transient faults in FPGA based space applications? Your answers should discuss FPGA-specific issues only.
14. Why is there a significant reduction in power, volume, and mass in reconfigurable FPGA-based TMR system as compared to conventional TMR systems?
15. Discuss one reason why reconfigurable TMR is preferred over conventional TMR.

Applying a High Performance Tiled Rad-Hard Digital Signal Processor to Spaceborne Applications
Image Processing Applications on a Low Power Highly Parallel SIMD Architecture

16. List 3 reasons that space processing is more challenging as compared to Earth-based/terrestrial process?
17. Why were the optimizations discussed in these papers important for their target applications and environment?
18. What is the downside of using an FPGA for space applications?

2/3/15:

A Real-Time Gracefully Degrading Avionics System for Unmanned Aerial Vehicles

19. What is Graceful Degradation?
20. What protocol is implemented in this gracefully degrading system? And how does it help in system recovery?
21. Briefly explain the steps involved in checkpointing loops.

2/5/15:

Synergistic Integration of Dynamic Cache Reconfiguration and Code Compression in Embedded Systems
SACR: Scheduling-Aware Cache Reconfiguration for Real Time Embedded Systems

22. Name one of the real time schedule techniques used in this paper and briefly describe how it works

23. Name one of the code compression techniques used in this paper and briefly describe how it works
24. The decompression unit can be either post- or pre-cache, each having different tradeoffs. Give one advantage for each method as compared to the other method.

Dynamic Cache Reconfiguration for Soft Real-Time Systems
SACR: Scheduling-Aware Cache Reconfiguration for Real Time Embedded Systems

25. What is deadline aware optimal cache configuration?
26. What is cache locking?
27. Why is it difficult to use cache reconfiguration in hard real time systems?

2/10/15:
MapReduce System over Heterogeneous Mobile Devices
Scheduling for Real-Time Mobile MapReduce Systems

28. What would be the main limiting factor when adding additional mobile devices to process data for a single MR application?
29. There are several important factors that must be considered when implementing MR over mobile devices that have not been considered in the paper implementation. List two of these
30. What happens to the priority of a task when a worker assigned to process that task fails?
31. What happens to an MR application on a mobile phone if the application is interrupted by: a) phone call, b) an SMS and c) a calendar alert? Discuss what happens for each of these, not just one of them

2/12/15:
On-Chip Control Flow Integrity Check for Real Time Embedded Systems
NEED 3 MORE

32. What type of hardware attacks will on chip control flow graph protect against?
33. What are the desirable characteristics of hardware security methods?
34. How does on chip control flow graph prevent against security attacks?

An Approximate Timing Analysis Framework For Complex Real-Time Embedded Systems

35. How does hill climbing avoid being stuck at local maxima?
36. How can RapidRT assign a confidence level of 99.7% to the EVT distribution?
37. What two considerations are used to establish the validity of AESIR-CORES?