

Ph.D. Comprehensive Examination

Computer Science Department
University of Miami

January 10, 2020

Student Name:

Student Number:

Problem number	Points (10 max)
1	
2	
3	
Total:	

1. I.D Software engineering

From the software engineering point of view, any software development process can be divided into several sub-disciplines:

- (a) Requirement Analysis
- (b) Functional Specification
- (c) Architectural Design
- (d) Implementation
- (e) Testing and Evaluation
- (f) Maintenance

Choose three sub-disciplines or tasks within these sub-disciplines that involve a mathematical approach, and illustrative them with examples.

2. I.E Systems

Compare and contrast (i) hierarchical, (ii) network, (iii) the relational, and (iv) object-oriented data models.

3. III.C Discrete Structures

Recall that the Hamiltonian Cycle Problem is the problem of deciding, on input graph G , whether G has a cycle that visits all the nodes exactly once. Show that this problem is polynomial time decidable if the input is restricted to the graphs with the property that each node has at most two neighbors (i.e., at most two adjacent nodes).