Final Exam, CS-415: Principles of Programming Languages Spring 2020, Iyengar

Due: **Noon Thursday 5/7/20.**

Describe at least two advantages and two disadvantages of the programming language you chose for your case study. (10)

C Language:

**Advantages: 1. Very fast and efficient compared to many other popular languages**

**2. Manual Memory Management allows for proprietary data storage and handling that isn’t possible in many other popular languages**

**Disadvantages: 1. Weak typing, manual memory management, etc. can make the language difficult to debug**

**2. Manual Memory Management poses a major security risk as, without the proper security procedures in place, a program could read/alter memory used by another program**

What is meant by functional language? (10)

What is meant by non-mutative language? (10)

What is meant by declarative language? (10)

Problem solving is nothing but symbol manipulation. Explain. (5)

What is a proposition? What is a predicate (how is it different from a proposition)? (5)

Describe the three core primitive operations in Lisp? (10)

**car – gets the first item from a list**

**cdr – gets everything except the first item from a list**

**cons – concatenates two lists together**

Write a prolog predicate to **count** the number of *positive* values in a list of numbers. (20)

Write a lisp function(s) that takes a list of items of the form – ‘(a b c d e f g) and returns a list of pair of lists the form – ‘((a c e g) (b d f)). (20).