Assignment 5 and 6 – CS 507 - Theory of Programming Languages
Fall 2020

Due: Monday November 30, 2020 – (online on Google Class – 8 AM)

If any assignment is deemed to be copied from any other student or internet, you may be awarded an F grade in this course.

Assignment 5 [30]

Question 1 [10]

Write a program with looping and conditional statements in Ada that will count the year and your age during each year from the time you got admission in Primary Education School until the year when you passed your intermediate exam. Include a special note the year you started school and another note the year you passed your intermediate exam and also when you started and completed your university. Example output follows:

1.   In 1995, I was 5 years old, and started School.
2.   In 1996, I was 6 years old.
3.   ...
4.   ...
5.   In , 2014 I was 19 years old, and passed intermediate exam.
6.   …

Question 2 [10]

Write a function or procedure in ADA that declares a 1D array of size 10, and initializes the array using a loop or recursive function. The values should be such that nth index of the array should have a value n^2

Question 3 [10]

Complete implementation of STACK in ADA programming language. You need to take care of all the conditions. You can use lecture slides to see the partially complete STACK implementation and work from there.

Assignment 6 [50]

Question 1 [10]
Write the Fibonacci function in Prolog:

$$fib(0) = 1$$

The Fibonacci function: $fib(1) = 1$

$$fib(n) = fib(n-1)+fib(n-2), \text{ when } n>1$$

Question 2 [10]

Implement the towers of Hanoi problem in PROLOG. You have to print the disc label/number that is being moved from one peg to another. For example if there are 4 discs then assume that the biggest disc is labeled/named 4 and the smallest disc is labeled/numbered 1. So the output should look like:

move disk 1 from peg A to peg B

Question 3 [10]
List questions (implement in PROLOG):
   a. Find the maximum number in a list of numbers.
   b. Find the minimum number in a list of numbers.
   c. Write a predicate to reverse the items in a list
   d. Find the sum of squares of all items in the list

Question 4 [15]
A small report (should not exceed three page), about **your experience** of using LISP, PROLOG and ADA. You can include in the report:
   o How easy or difficult was it to learn the language
   o How do you compare logic and functional programming paradigms with imperative and object oriented paradigms
   o What do you like and dislike about these three languages

Question 5 [5]
Search about the cut predicate in PROLOG and describe how it is used.