Test – Pragmatic Software

1. Write a program that finds the longest palindromic substring of a given string. Try to be as efficient as possible! (**15 points**)

2. Write a program to calculate the power of any number using recursion. **(10 points)**

3. Write a function that takes a list of numbers, a starting base b1 and a target base b2 and interprets the list as a number in base b1 and converts it into a number in base b2 (in the form of a list-of-digits). So for example [2,1,0] in base 3 gets converted to base 10 as [2,1] (**15 points**)

4. How do you swap two numbers without using the third variable? (**15 points**)

5. What are threads and how are they used in programming? Give an example of multi-thread programming in your platform of choice (.NET, Java, Python, etc.). Describe a problem whose performance can be improved by using multiple threads. (**20 points**)

6. We have two sequence of data called respectively haystack and needle. We need to search for all the occurrences of any sequence of data having length greater or equal to threshold that appear both in haystack and needle. (**25 points**) For example given:

   haystack = “vnk2435kvabco8awkh125kjneytbcd12qjhb4acd123xmnbqwnw4t”
   needle = “abcd1234”
   threshold = 3

   the expected output would be:

   sequence of length = 3 found at haystack offset 9, needle offset 0
   sequence of length = 5 found at haystack offset 27, needle offset 1
   sequence of length = 5 found at haystack offset 38, needle offset 2