CISS 160 Algorithm Exercises 01 – 30 Points

Type out (in a Word or RTF document) the solutions to the following problems. Name your document **CISS 160 Algorithm Exercises 01 – Your Name** (where Your Name is, of course, your actual name).

Note that student solutions will vary – there can be various solutions to each problem and (at this point in your learning) your solution may not be fully correct. What I am looking for is that you can logically approach a problem and break it down into steps.

As far as basic structure of each Algorithm, use the Input/Processing/Output (IPO) layout that I discussed, which looks something like:

IPO/Algorithm

GOAL: …State the goal/what your Algorithm is going to accomplish…

INPUT: ….Describe the input(s) to the process….

PROCESSING:

….Describe all of the processing steps involved… based on utilizing the INPUT, processing it, and producing the OUTPUT; this may include calculations, repeating a set of steps, conditional logic ("If this happens then do this, otherwise do that") etc. – **The PROCESSING area is the most important part of the Algorithm** and requires the most thought and documentation…

OUTPUT: …Describe the Output(s) that result from the processing…

TESTING: … If a program were coded in C# based on this Algorithm, describe the different 'Tests' that you would perform to give yourself assurance that the program would be considered valid/working correctly; this can include validating data to be numeric, validating that data was entered, and other tests you can perform etc. etc.

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1. Create an IPO Design/Algorithm describing the steps you would follow to calculate the average (mean) for a set of numbers. Assume you are given the numbers on a set of index cards and that you can only process one card at a time (you can't see the next card until you have finished processing the current card). 10 Points.

I have included the .exe of the program based on that code so you can run it.

2. Create an IPO Design/Algorithm describing the steps you would follow to determine if a given number (an integer) is a prime number or not. Recall that an integer is prime if it is ONLY evenly divisible by 1 and the number itself. For instance, 13 is prime because it is only evenly divisible by 1 and 13. On the other hand, 24 is not prime because it is evenly divisible by 1, 2, 3, 4, 6, 8, 12, and 24. It will help you to think back to elementary school division and remainders to solve this problem. 10 Points.

I have included the .exe of the program based on that code so you can run it.

3. Create an IPO Design/Algorithm describing the steps you would follow to convert a decimal number (an integer) to a binary number. For example, decimal 23 expressed as binary is 10111. (Your text spends some time explaining integer numbers and their equivalent binary numbers, and this topic also should have been covered in CISS 121). 10 Points

I have included the .exe of the program based on that code so you can run it.