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Professor Richard Whalen
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Dear Professor Whalen,

Hope you are doing well. In the additional problem (Problem 2), I determined that I would choose Vendor B (from Exercise 3) as the vendor to purchase my alloy scrap, ferrochrome in addition to pure nickel, pure iron, and pure graphite to make 100 kg of AISI 304 stainless steel. I choose Vendor B because the compositions of alloy scrap and ferrochrome gave me an appropriate amount of each material mentioned above to create the 100 kg of stainless steel. With Vendor A, when I solved for the amount of each material required, there was a negative amount of iron required. This implied that the total mass of the other 4 materials exceeded 100 kg, thus not satisfying the co-op job demands. Using MATLAB, I used matrices and inverse matrices to solve for the appropriate amounts of each material while satisfying system of equations. I used the method $[A][X] = [D]$ where $[A]$ was the element composition (percentages) of each material, $[D]$ was the element composition of the stainless steel itself, and $[X]$ was the unknown amount needed to satisfy the system. Using algebra, I determined that $[X] = [D]*[A]^{-1}$. With MATLAB syntax, I was able to solve for $[X]$ using two different methods. I first made a matrix $[C]$ the inverse of $[A]$ using $c = \text{inv}(a)$. Then I made $X1 = C*D$. I also made $X2 = A\backslash D$ which is equivalent to the reciprocal, or D/A . I then realized that $X1$ was equal to $X2$ due to MATLAB's syntax rules. I also learned to print results to a txt file using `fprintf`. The most important things were learning how to use the '%' key and spacing out your results for readability. You will find my assignment results attached with this letter. I look forward to seeing your evaluation of my assignment.

Best regards,

Jordan Lian