**CSC 1500 – Homework 7**

1. Determine the number of permutations of the set {A, B, C, D, E, F} where the word “BED” appears. Assume each permutation must use all six letters without repeating any. (*20 pts.*)

Due to order, there are actually only 4 items in the set:

{BED,A,C,F}

Permutation without repetition formula = n!(n-r)! = 4!/(4-4)! = 4! = 24

**(2)** If a restaurant serves seven different items, and you can purchase a combination of any three items (including ordering the same item multiple times), how many different possible combinations of three are there? (*20 pts.*)

N = 7

R = 3

Combinations with repetition formula = (n+r-1)!/(r!\*(n-1)!) = (7+3-1)!/(3! \* (7-3)!) = 84

**(3)** A chat-bot is pulling words from its memory to make a 10-word sentence. It has 75 words, and once a word is used it cannot repeat it. How many possible permutations of sentences can the chat-bot make? (*20 pts.*)

Permutations without repetition.

N = 75

R = 10

Permutation without repetition formula = n!(n-r)! = 75! / (75-10)! = 75!/65! = 75\*74\*73\*72\*71\*70\*69\*68\*67\*66 = 3008025198741024000

**(4)** A lottery ticket has the numbers 1 through 25 listed on it. The user it asked to circle five numbers for their bet. Assuming the user can only use a number once in any bet, how many different combinations are there? (*20* *pts.*)

Combinations without repetition: = n!/(r! \* (n-r)!)

N = 25

R = 5

= 25!/(5!\*(25-5)! = 65780

**(5)** Your password system uses the English alphabet of 26 letters, is CASE SENSITIVE (meaning upper-case letters and lower-case letters are considered to be different from each other), and also uses the numbers 0-9. Assuming you can repeat characters, how many different permutations are there if your password is six characters long? (*20 pts.*)

26 uppercase + 26lowercase + 10numbers = 62

Permutations with repetition formula = n!

N = 62

62! = 3.1469973e+85 (a really big number calculators do not like expressing. Why are calculators such cowards GIVE ME ALL THE DIGITS I DON’T WANT NO SCIENFITIC NOTATION).