Some Algebraic Combinatorics on Prime Constrained Languages

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The purpose of this research is to create the languages that can be defined by alphabet {0,1,2,...,n-1}, where n is a natural number. From Bacher(2010), we decided to create a new equivalence relation to divide words into small sets as partitions. Because of some special properties of prime number, we discover a new way to proof a useful series by considering the number of words in our partitions. Moreover, we establish some graphic arts from that division. In addition, we study more about the properties of words in the languages which are related to prime numbers in a variety of ways. Finally, we discover a new way that considers the words with length prime, using the period of words as same as using the period in counting necklaces that is defined in Mobius Inversions Formula, and the conditions of their periods. This way can help us to proof a Fermat's little theorem. The findings indicate that the results that we develop can be of use for mathematics areas and may be of use for computer science areas.

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