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Course: CSC 371 – 01 Finite Automata

Assignment Topic: Pumping Lemma – Real-time examples

1. L= {0^n 1^n }

This language forms a string of "0000011111", where the number of 0s and 1s are equal.

Real-life Examples:

A computer scientist working on developing a new programming language that wants to strike a balance between the program being robust, well-defined yet easy-to-use.

A party where cupcakes are being served, each cupcake should have the same size and fixed volume for it to be perfect.

2. L= {Equal 0s and 1s}

This language forms a string that has equal number of 0s and 1s.

Real-life Examples:

A message that needs to be sent over a noisy channel and there are errors during the transmission. One way to ensure that the correct message is being transferred, parity bits can be used, which can detect and correct errors in the message.

While constructing a palindrome, all the string must read the same forwards and backwards. If a palindrome has characters "1" and "0", then the number of 1s and 0s have to be equal.

3. L={More 1s than 0s}

This language forms a string of more number of 1s as compared to 0s

Real-life Examples:

The system of Morse code uses a combination of dots and dashes to represent letters and numbers. Both the letter "E" and the letter "T" are represented by a single dot and a single dash, respectively. The overall Morse code pattern comprises more dots (indicating 1s) than dashes since "E" is a more common letter than "T," and vice versa (representing 0s).

A digital clock, where the digits are displayed using segments that can be turned on or off, might serve as a practical illustration of this. Typically, the segment that corresponds to the number "1" is utilized more frequently than the segment that corresponds to the number "0".