

CSC341 Lab 8B

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Academic Honesty

Written Sources Used:

Michael Sipser - Introduction to the Theory of Computation

Help Obtained:

None

Question 1

1)

To prove $L = \Sigma^*$ without the binary interpretation, we can ensure this by prefixing a specific unique natural number in front of each input that represents the total length of the input string. For example, if we prefix '111' in front of each input as a prefix, this indicates the input length will be a total length of 3.

2)

This works for any input, regarding binary representation, natural numbers, letters.. etc, since the prefix will tell how long the input string is we will have a separate place for the input string which will work for any input.

3)

Like the examples of binary representations, Java programs also consist of finite set of characters like letters, numbers, and symbols. Since Java programs are uniquely represented from the input symbols, and we are able to count the numbers (and other symbols) through the above procedure, it is possible to count all possible Java programs.

Question 2

This proof is wrong because it is applying the diagonalization argument to natural numbers to suggest that N is uncountable. But, unlike real numbers, modifying digits to make non-listed n is impossible since natural numbers have finite length and is unable to represent infinite decimals like real numbers.