DIS 3D

Tuesday, July 3, 2018   4:42 PM
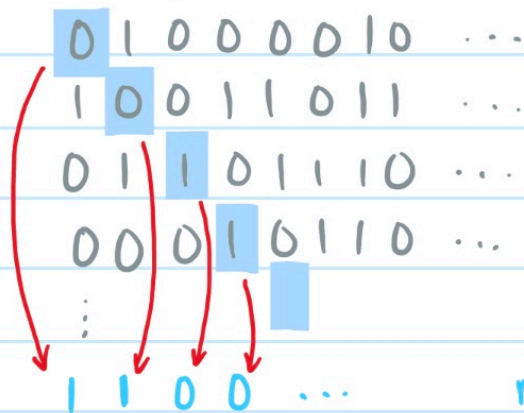
Topic : Countability

Countable

- there exists a bijection between set A and a subset of $\mathbb{N}$.
- countably infinite : countable + infinite
  e.g. $\mathbb{N}$, $\mathbb{Q}$, bit strings with finite length

Uncountable

- Show a set A is uncountable :
  either show there exists a bijection from A to an uncountable set
   or   use diagonalization
- uncountable sets e.g. : $\mathbb{R}$, bit strings with infinite length
  e.g.   bit strings with infinite length

```
0 1 0 0 0 0 1 0 ...
1 0 0 1 1 0 1 1 ...
0 1 1 0 1 1 1 0 ...
0 0 0 1 0 1 1 0 ...
  ⋮

  1 1 0 0 ...        new bit string w/ infinite length!
```