ECS 315: In-Class Exercise 2 Solution

Instructions

1. Separate into groups of no more than three persons.
2. Only one submission is needed for each group.
3. **Do not panic.**

Name	ID
Prapun	**555**

1. For each of the sets provided in the first column of the table below, indicate (by putting a Y(es) or an N(o) in the appropriate cells of the table) whether it is "finite", "infinite", "countably infinite", "uncountable". Explanation is not needed.

		Finite	Infinite	Countably Infinite	Uncountable
(a)	$\{1,2,3,\ldots,8\}$	**Y**	**N**	**N**	**N**
(b)	$\mathbb{N}$	**N**	**Y**	**Y**	**N**
(c)	$[2,4)$	**N**	**Y**	**N**	**Y**

(a) The number of elements in the set $\{1,2,\ldots,8\}$ is 8.

$8 \in \mathbb{N} \cup \{0\}$. Therefore, the given set is finite.

Because the set is finite, it is not infinite.

Both countably infinite sets and uncountable sets are infinite.

Therefore, finite sets can't be countably infinite nor uncountable.

(b) As seen in class, the set $\mathbb{N} = \{1,2,3,\ldots\}$ is countably infinite.

(This can be easily seen from the fact that it can be expressed as $\{a_1, a_2, \ldots\}$ by setting $a_1 = 1$, $a_2 = 2$, ...

A countably infinite set is both countable and infinite.

Because it is infinite, it is not finite.

Because it is countable, it is not uncountable.

(c) Any interval with positive length is uncountable.

Because it is uncountable, it is not countable and hence is not countably infinite.

Any uncountable set is infinite and hence not finite.