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Definition 1.1 (topology)**.** *A* ***topology*** *on a set* $\mathbb{X}$ *is a collection* $\mathbb{T}$ *of subsets of* $\mathbb{X}$ *having the following properties:*

- $\emptyset$ *and* $\mathbb{X}$ *are in* $\mathbb{T}$
- *The union of the elements of any sub collection of* $\mathbb{T}$ *is in* $\mathbb{T}$
- *The intersection of the elements of any* ***finite*** *sub collection of* $\mathbb{T}$ *is in* $\mathbb{T}$

Definition 1.2 (topology space)**.** *A* ***topological space*** *is a set* $\mathbb{X}$ *for which a topology* $\mathbb{T}$ *has been specified.*

Definition 1.3 (open set)**.** *A* ***open set*** $\mathbb{U}$ *is a subset of* $\mathbb{X}$ *that belongs to a topology* $\mathbb{T}$ *of* $\mathbb{X}$*.*

Definition 1.4 (open sets)**.** *A topology can also be called a* ***open sets***

Definition 1.5 (discrete topology)**.** *The set of all subsets of a set* $\mathbb{X}$ *formed a topology called* ***discrete topology***

Definition 1.6 (trivial topology)**.** *The set consisting the set* $\mathbb{X}$ *and* $\emptyset$ *only formed a topology of* $\mathbb{X}$ *called* ***trivial topology***

Definition 1.7 (finite complement topology)**.** *Let* $\mathbb{X}$ *be a set. Let* $\mathbb{T}_f$ *be the collection of all subsets* $\mathbb{U}$ *of* $\mathbb{X}$ *such that* $\mathbb{X} - \mathbb{U}$ *either if a* ***finite*** *of is all of* $\mathbb{X}$*. Then* $\mathbb{T}_f$ *is a topology on* $\mathbb{X}$*, called the .*

The set $\mathbb{U}$ can form a topology because of the definition of topology is intersection of finite sub collection. If this can be intersection of infinite sub collection, $\mathbb{U}$ will not be a topology.

Definition 1.8 (finer, larger, strictly finer, strictly larger, coarser, smaller, strictly coarser, strictly smaller, comparable)**.** *Let* $\mathbb{T}$ *and* $\mathbb{T}'$ *be two topology on a given set* $\mathbb{X}$*. If* $\mathbb{T}$ *is a subset of* $\mathbb{T}'$*, we say that* $\mathbb{T}'$ *is* ***finer*** *or* ***larger*** *than* $\mathbb{T}$*. If* $\mathbb{T}$ *is a proper subset of* $\mathbb{T}'$*, we say that* $\mathbb{T}'$ *is* ***strictly finer*** *or* ***strictly larger*** *than* $\mathbb{T}$*. We also say that* $\mathbb{T}$ *is* ***coarser*** *or* ***smaller*** *or* ***strictly coarser*** *or* ***strictly smaller*** *than* $\mathbb{T}'$*. We say that* $\mathbb{T}$ *and* $\mathbb{T}'$ *is* ***comparable*** *if either* $\mathbb{T}$ *is a subset of* $\mathbb{T}'$ *or* $\mathbb{T}'$ *is a subset of* $\mathbb{T}$*.*