Questions

- What I want to do
  - to build a graph from a given manifold
- What graph I want to build
  - a Graph consists of simplexes as vertex and edges
  - the graph isomorphic to the given manifold
  - the capability to subdivide the graph to get a finer graph
- What functions I want to implement
  - `search`: search the graph with a given start vertex and a given goal.
    - `goal` can be a vertex, an edge, or a subgraph.
      - the goal can be set with a series of conditions.

    - `alg` supports various algorithms including `dfs`, `bfs`, etc.
    - `advisor` ranks given vertices(e.g. the neighbors of a vertex).
    - `hook` will be called before or after a vertex is visited.
        - `hook` can be used to implement `advisor`.
- `subdivide`
- `nvertex`
- `nedge`

Components

Manifold or SCG(Simplitical Complex Graph)

A **manifold** is a topological space that locally resembles Euclidean space near each point. Naively, one can think of a n-dimentional manifold as a n-

dimentional polyhedron in the limit of infinite subdivision.

$$
\begin{aligned}
&n \text{ -dim Manifold } M \\
&\equiv \{c^n(P) \times g(P) |\ \forall P \in M\} \\
\equiv \{&\text{neighbors of } c(P) |\ \forall c(P) \in \mathrm{SCG}\}
\end{aligned}
$$

- `simplitical_subdivide`:
  - perform simplitical subdivision on the given manifold or simplitical complex graph.
  - return the isomorphic complex in form of graph.
    - `precition_goal`:
  - TODO: `triangulation` implication
    - `triangulation` is an specific algorithm of `simplitical_subdivision`
    - `enmeshment`

        - if there is even number of vertex in the SCG, then
    - TODO:
- `nvertex`
- `nedge`

Complex Graph

Grid Complex Graph

Vertex

Grid Vertex

Edge

Grid Edge