

# Design pattern for graph processing

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**Design pattern.** Decouple graph data type from graph processing.

- Create a Graph object.
- Pass the Graph to a graph-processing routine.
- Query the graph-processing routine for information.

```
public class Paths
```

```
    Paths(Graph G, int s)
```

*find paths in G from source s*

```
    boolean hasPathTo(int v)
```

*is there a path from s to v?*

```
    Iterable<Integer> pathTo(int v)
```

*path from s to v; null if no such path*

```
Paths paths = new Paths(G, s);  
for (int v = 0; v < G.V(); v++)  
    if (paths.hasPathTo(v))  
        StdOut.println(v);
```

← print all vertices  
connected to s