

```

[ 1, 2, 3, 4, 5 ]
}
for (int x: arr) {
}

```

```

arr = {
  0: { 1, 2, 3, 4, 5 }
  1: { 0, 2, 3, 4, 5 }
  2: { 0, 1, 3, 4, 5 }
  3: { 0, 1, 2, 4, 5 }
  4: { 0, 1, 2, 3, 5 }
  5: { 0, 1, 2, 3, 4 }
}
for (int x: arr.get(0)) {
  sysout(x);
}

```

```

[ 1, 2, 3, 4 ]
[ 5, 6, 7, 8 ]
}
for (int x: arr[0]) {
  sysout(x);
}

```

Groups

DFS

BFS

→ Recursion

→ Deep

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

→ O(n)

Queue

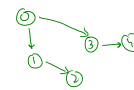
Level by level

O(n)

O(n)

BFS

DFS



```

graph.get(u).add(v);

```

5

u v

0 3

1 2

3 4

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

0 1

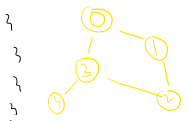
0 1

0 1

0 1

0 1

0 1



```

graph.get(u).add(v);

```

0 1 2 3 4

0 1 2 3 4

0 1 2 3 4

0 1 2 3 4

0 1 2 3 4

0 1 2 3 4

0 1 2 3 4

0 1 2 3 4

0 1 2 3 4

0 1 2 3 4

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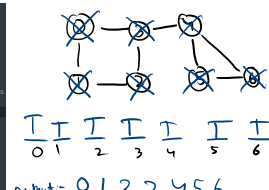
0 1 2 3 4

0 1 2 3 4

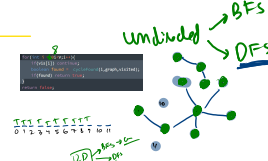
```

void BFS(int s) {
  // your code here
  Queue<Integer> q = new LinkedList<>();
  boolean[] visited = new boolean[this.vertices];
  while (!q.isEmpty()) {
    Integer u = q.poll();
    if (visited[u]) continue; // to prevent cycles
    visited[u] = true;
    // print u
    for (Integer v : adjList.get(u)) {
      if (!visited[v]) {
        q.add(v);
      }
    }
  }
}

```



output = 0 1 3 2 4 5 6



undirected → BFS

undirected → DFS

undirected → BFS

undirected → DFS

undirected → BFS

undirected → DFS

undirected → BFS

undirected → DFS

undirected → BFS

undirected → DFS

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undirected → BFS

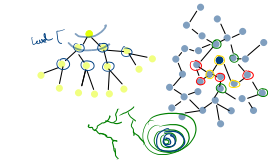
undirected → DFS

undirected → BFS

undirected → DFS

undirected → BFS

undirected → DFS



undirected → BFS

undirected → DFS

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undirected → DFS

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