

BREADTH-FIRST SEARCH (BFS) BFS

```

BFS(VERTEX V)
{
  V.MARKED = TRUE
  INITIALIZE QUEUE Q WITH V
  WHILE (Q IS NOT EMPTY)
  {
    W ← DELETE FROM QUEUE Q
    FOR EACH U ADJACENT TO W DO
    {
      IF (!U.MARKED)
      {
        ADD U TO QUEUE Q
        U.MARKED ← TRUE
      }
    }
  }
}

```

```

BFS TRAVERSAL
{
  FOR EVERY V IN G DO
  {
    V.MARKED = FALSE
    FOR EVERY U IN G DO
    {
      IF (!U.MARKED) BFS(U)
    }
  }
}

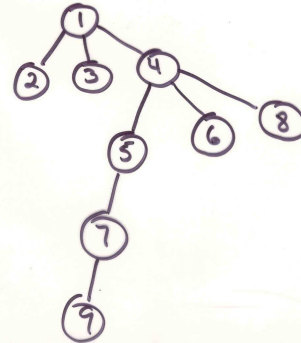
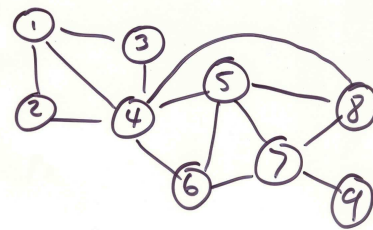
```

TIME COMPLEXITY $O(n+m)$
 n : vertices
 m : edges
 SPACE COMPLEXITY $O(n)$

UCSB

TG

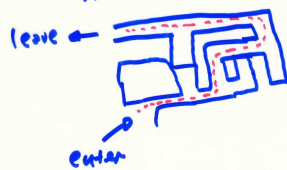
EXAMPLE BFS



UCSB

TG

GIVEN A MAZE FIND BFS A PATH



USE DFS
 OR BFS "FINDS SHORTEST
 PATH!"

BFS USED IN OTHER
 APPLICATIONS
 E.G. FIND RADIUS
 OF GRAPHS

UCSB

TG