

```
:- use_module(library(pce)).
```

```
% Sample graph
```

```
edge(a, b).
```

```
edge(a, c).
```

```
edge(b, d).
```

```
edge(b, e).
```

```
edge(c, f).
```

```
edge(e, g).
```

```
% BFS algorithm
```

```
bfs(Start, Goal, Path) :-
```

```
    bfs_helper([[Start]], Goal, RevPath),
```

```
    reverse(RevPath, Path).
```

```
bfs_helper([[Goal|Rest]|_], Goal, [Goal|Rest]).
```

```
bfs_helper([CurrentPath|OtherPaths], Goal, Path) :-
```

```
    CurrentPath = [Node|_],
```

```
    findall([Next|CurrentPath],
```

```
        (edge(Node, Next), \+ member(Next, CurrentPath)),
```

```
        NewPaths),
```

```
    append(OtherPaths, NewPaths, UpdatedPaths),
```

```
    bfs_helper(UpdatedPaths, Goal, Path).
```

```
% GUI to show BFS path with clickable options
```

```
go :-
```

```
    findall(Node, (edge(Node,_); edge(_,Node)), NodesDup),
```

```
    sort(NodesDup, Nodes), % Unique nodes
```

```
    new(Dialog, dialog('BFS GUI')),
```

```
    send(Dialog, append, new(StartMenu, menu(start_node, cycle))),
```

```
    send(Dialog, append, new(GoalMenu, menu(goal_node, cycle))),
```

```
    add_nodes_to_menu(Nodes, StartMenu),
```

```
    add_nodes_to_menu(Nodes, GoalMenu),
```

```
    send(Dialog, append, button(run, message(@prolog, run_bfs, StartMenu?selection,  
GoalMenu?selection))),
```

```
    send(Dialog, open).
```

```
add_nodes_to_menu([], _).
```

```
add_nodes_to_menu([H|T], Menu) :-
```

```
    send(Menu, append, H),
```

```
    add_nodes_to_menu(T, Menu).
```

```
run_bfs(Start, Goal) :-
```

```
    (bfs(Start, Goal, Path) ->
```

```
        format('BFS Path: ~w~n', [Path]),
```

```
        display_result(Path)
```

```
    ;
```

```
    send(@display, inform, 'No path found')
```

).

display\_result(Path) :-

```
(get(@display, exists) -> true ; new(@display, dialog('BFS Result'))),  
send(@display, clear),  
send(@display, append, text(Path)),  
send(@display, open).
```

```
File Edit Settings Run Debug Help  
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For online help and background, visit https://www.swi-prolog.org  
For built-in help, use ?- help(Topic). or ?- apropos(Word).  
  
?- working_directory(_, 'D:/Prolog').  
true.  
  
?- [bfs_gui].  
true.  
  
?- go.  
true.  
  
?- BFS Path: [a,b,d]
```

