Lab 5

Question 1

Question 1

Indicate the centre vertex and the list of edges included in the spanning spider.

Centre vertex is **d**.

The edges are edge(a,x) edge(b,y) edge(c,z) edge(d,e) edge(d,c) edge(d,b) edge(d,a).

Question 2

Provide ASP rules that define the centre/1.

```
1{centre(X) : vertex(X)}1 :- .
```

Question 3

Provide a generator for the leg/2 predicate.

```
edge(Y,X) :- edge(X,Y).

 {leg(X,Y) : edge(X,Y)}1 :- vertex(X), not centre(X).

1{leg(Y,X) : edge(X,Y)}1 :- vertex(X), not centre(X).

 {leg(X,Y) : edge(X,Y)}  :- vertex(X), centre(X).
```

Question 4

define a constraint that ensures every vertex of the original graph is reachable.

```
:- not path(X,Y), centre(X), vertex(Y), X!=Y.
```

Question 5

Describe all the other constraints that need to be satisfied and write ASP rules to enforce these constraints.

Other constraints are:

There must be no cycle.

```
path(X,Y) :- leg(X,Y).

path(X,Z) :- path(X,Y), path(Y,Z).

:- path(X,X).
```

Question 6

How many distinct spanning spiders does the graph in Figure 1 have?

74

Question 7

Write an ASP program spidershortlegs.lp that outputs a spanning spider with the shortest longest leg.

```
dist(X, D) :- vertex(X), D = #count {I: path(I, X)}.

longest(M) :- M = #max {D:dist(X,D), vertex(X)}.

#minimize {M:longest(M), M>0}.
```