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?

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## 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}.