**Graph Modelling – Course Graphs**

For each course at a university, there may be one or more courses that are its prerequisites. What we need to ask ourselves is;

1. How can a graph be used to model these courses and which courses are prerequisites for which courses?
2. Should edges be directed or undirected?
3. How can we find courses that do not have any prerequisites and how can we find courses that are not the prerequisite for any other courses?

To answer the first question, we can model this graph where each vertex represents a course. Should the edges be directed or undirected? The edges should be directed hence there is a directed edge(a,b) from **course a** to **course b** if **course a** is a prerequisite of **course b.** To answer the third question, Courses that do not have any prerequisite courses, do not have any incoming edges to them and courses that are not prerequisite of any other courses do not have outgoing edges from them.

The following is a simple graph model for courses at a university and their prerequisites. M stands for math and CS stands for computer science.
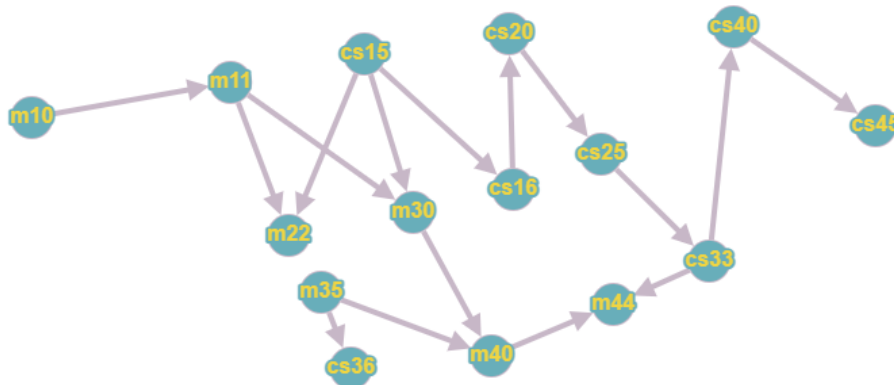


From the above graph we see that for instance, m10 is a prerequisite course for m11 because there is a directed outgoing edge from m10 to m11. We also see that m10 does not have any prerequisite courses because there is no incoming edge to it.  m11 and cs15 are prerequisite courses for m22 and m30. cs15 also does not have any prerequisite courses but it is a prerequisite course for m22, m30 and cs16. We see that m22, cs36, m44 and cs45 are not prerequisite courses for any other course because there are no outgoing edges from them.

Nb/ This is just a small graph for demonstration, graphs to model all courses taken in a university can be very huge.