MP305 Practical 2017/2018 - Activity Networks I

The Maple procedures that perform the activity network algorithms are found by opening up the Maple worksheet `cripath1.mw`

This file may be downloaded from the **MP305 Blackboard** web page.

An explanation is given there of all the procedures used. A project consists of `N` activities given by a set `Act:={"A","B",...}`, with completion times given by a table `Time` with entries such as `Time["A"]:=3` etc. and precedence relations given by a table `Prec` with entries such as `Prec["A"]:={}` if no preceding activity is present or `Prec["A"]:={"B"}` if `"A"` is preceded by `"B"`.

The procedure `Activity(Act,Time,Prec)` then produces a set, `G`, of arcs `[i,j]` with vertices `i,j` labelled by `0,1,2,...,N+1` e.g. `G:={[0,1],[1,2],...}`. The START vertex has label `0` and the FINISH vertex has label `N+1`. The completion times for each activity are described by `T`, an array, e.g. `T[0]:=0; T[1]:=3;` etc. A graph is also displayed showing the activity network (without time labels).

The procedure `CritPath(G,T)` computes the critical path, the minimum project completion time, the earliest and latest starting times and the float for each activity.

Notice

A solution to the question marked with **(*)** has to be shown (and explained) to the instructor at the practicals in order to get 2% that count towards the overall mark.

1. Analyse the chemical production problem discussed in class as given in the the `cripath1.mw` worksheet.

2. **(*)** Find the critical path and the minimal completion time for the following assembly problem with 10 activities (A-J):

   Activity A precedes activity J and the completion time is 7.

   Activity B precedes activity J and the completion time is 7.

   Activity C precedes activity J and the completion time is 7.

   Activity D precedes activities C, E, F and J and the completion time is 2.

   Activity E precedes activities C, H, I and J and the completion time is 3.

   Activity F precedes activities G, H and I and the completion time is 2.

   Activity G precedes activities H and I and the completion time is 2.

   Activity H precedes Finish and the completion time is 8.

   Activity I precedes Finish and the completion time is 8.

   Activity J precedes Finish and the completion time is 18.