Project Scheduling with Triangular Distributions (CSE412, July 2022)

Introduction

PERT *(Program Evaluation and Review Technique)* **Chart Analysis** is a widely used project management tool for scheduling, organizing, and coordinating tasks within a certain project. The **PERT Chart** provides a graphical representation of a project's timeline, enabling project managers to break down each individual task within the project for analysis.

In this assignment, we will analyze two simulated projects using information from their corresponding PERT charts. We will use following 3 (three) probability distributions in this assignment to introduce stochasticity in the simulation.

1. Triangular `TRIANG(a, b, m)` distribution
2. Right-triangular `RT(a, b)` distribution
3. Left-triangular `LT(a, b)` distribution

Here, `a` is location parameter, `b-a` is scaling parameter, and `m` is shape parameter. These distributions will be used to determine the duration of each task within a project.

Project Details

Project-1					Project-2				
Task	Immediate Ancestor(s)	a	m	b	Task	Immediate Ancestor(s)	a	m	b
A		2	3	4	A		1.5	2.75	4.25
B	A	5	5	5	B	A	3	4	5
C	A	3	6	11	C	A	2.3	2.3	2.3
D	A	1	6	12	D	B	1	2	4
E	B	6	7	8	E	B	5.4	6.7	7.6
F	C, D	4	6	8	F	C	5	7	9
G	E	8	11	13	G	C	1.2	2.4	3.6
H	F	3	3	3	H	D, E, F	3.1	5.3	7.9
I	F	9	11	14	I	F, G	6	7	8
J	G	7	8	10	J	H, I	0.4	0.4	0.4
K	I	1	2	5	K	I	0.2	0.8	3.2
L	H, J, K	10	12	15	L	J, K	1.3	3.5	5.8

Here, `a` is **Optimistic** value (in days), `m` is **Most Likely** value (in days), and `b` is **Pessimistic** value (in days) for the duration of a certain task.
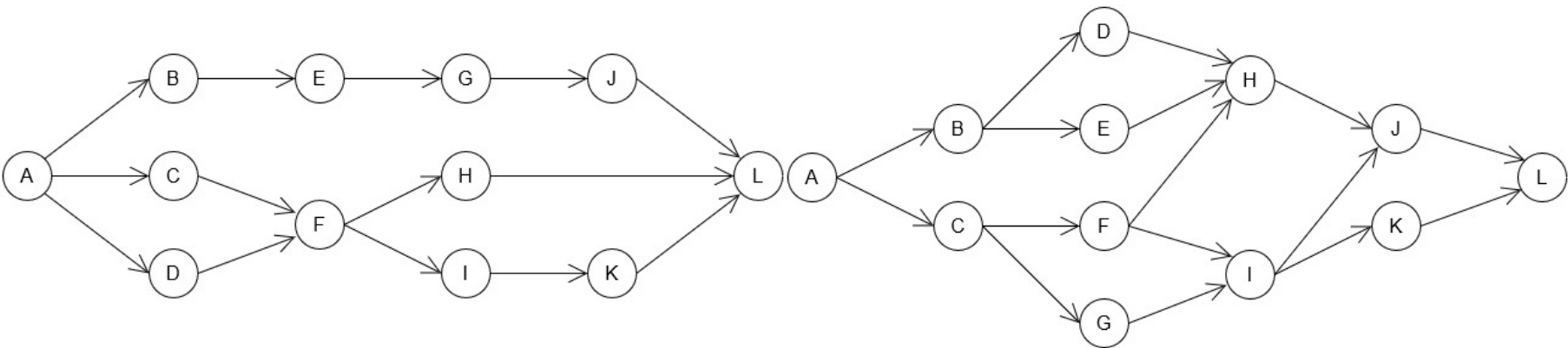
The left diagram depicts the PERT chart for **Project-1** and the right diagram depicts the same for **Project-2**.

In this assignment, we will find out *average project duration* as well as *success rate* using **Microsoft Excel**, taking *1000* trials, for both projects. The *success* is defined as finishing the project on or before a fixed deadline. We will assume that the deadlines are *46* days and *24* days for **Project-1** and **Project-2** respectively. And, we will use the aforementioned 3 (three) triangular probability distributions to determine the duration of each task within a project.