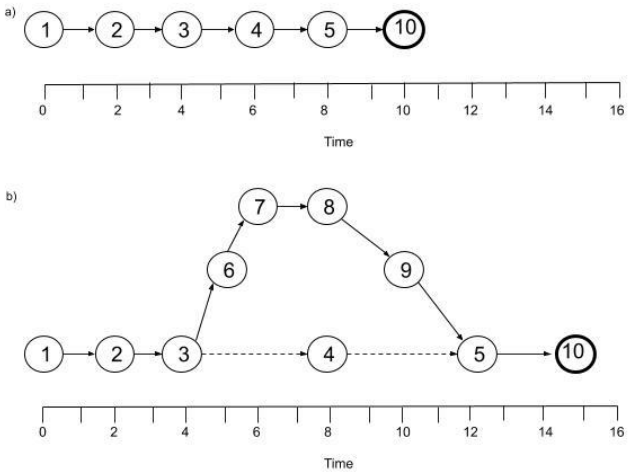
Appendix I
Example of progress monitoring

For example, Figure I.1 shows two sequences of actions to arrive at a shared objective (node 10), with the respective times. For each unit of time, we can calculate the progress by multiplying the time that has elapsed since the last piece of feedback was given by the number of actions needed to meet the objective. If we set a limit of 15, then in the case of sequence a) in Figure I.1, the agents will always be considered to be making progress. This is because the highest score they can obtain is when the time since the last feedback is 5 and the distance from the objective is 3. Furthermore, from sequence b) in Figure I.1, we can see that after 5 units of time the distance from the objective increases. The result of multiplying this by the time elapsed since the last feedback message was sent is 25, which is greater than 15. In this case, it would be determined that the agents are not making progress.



t	tlf	d	p	result	t	tlf	d	p	result
1	1	5	5	Progressing	6	6	2	12	Progressing
2	2	4	8	Progressing	7	7	2	14	Progressing
3	3	4	12	Progressing	8	8	1	8	Progressing
4	4	3	12	Progressing	9	9	1	9	Progressing
5	5	3	15	Progressing	10	10	0	0	Progressing

t	tlf	d	p	result	t	tlf	d	p	result	t	tlf	d	p	result
1	1	5	5	Progressing	6	1	4	4	Progressing	11	6	2	12	Progressing
2	2	4	8	Progressing	7	2	4	8	Progressing	12	7	1	7	Progressing
3	3	4	12	Progressing	8	3	3	9	Progressing	13	8	1	8	Progressing
4	4	3	12	Progressing	9	4	3	12	Progressing	14	9	1	9	Progressing
5	5	5	25	No progressing	10	5	2	10	Progressing	15	10	0	0	Progressing

Figure I.1: Representing progress in the game