Schedule under Uncertainty

- P_r: the possibility of moving to the next node at a node in the real world
- P_p: the possibility of moving to the next node at a node in the prediction
- $Cost_p(schedule)$: cost function of a schedule, used for evaluating a schedule while scheduling
- $Cost_r(simulation)$: cost function of a simulation run, used for evaluating a scheduler at the end of a simulation

Approach #1 (Robert)

Resolves the conflicts (adds delay to the aircraft with lower priority) that happens with possibility P_c larger than the predefined threshold $P_{threshold}$. $P_{threshold}$ can be set to adjust what kind of scheduler we prefer, a more efficient one or a more robust one.
Challenge: what is the programming model of calculating the probability combination of conflicts?

Approach #2 (Corina)

We start with a deterministic greedy schedule. Then, we run predictions for N (say 1000) rounds. In each prediction, we apply a deterministic conflict resolution method to deal with conflicts. Therefore, we will obtain N schedules. In these N schedules, we pick the one with a minimum cost. The cost should be defined as $Cost(schedule, frequency of this schedule).
Challenge: we are not sure how to model frequency into the cost function.

Approach #3 (Heron)

We start with a deterministic greedy schedule. Then, we run predictions for N (say 1000) rounds. In each prediction, we counts the conflicts but we don't resolve them. In the first iteration, we plot the cost (which counts the conflict as a penalty) and got a list of conflicts with corresponding frequency. We resolve the conflict with a highest frequency, then run the same iteration again util we find a minimum cost.
Challenge: this is the most computation heavy solution and we are not sure if this will provide a good schedule.