Final Presentation

Task 4: Market-based task allocation with heterogeneous team of robots

Groupe 8

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1. Introduction
2. Centralized
3. Distributed
4. Conclusion

Introduction : World and Scenario

Natural Disaster with several victims :

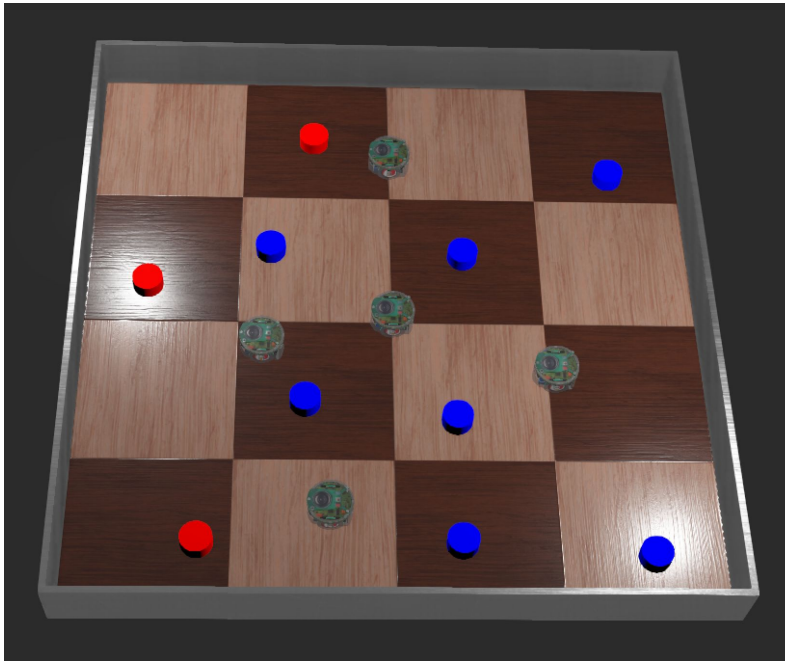
- Medical treatment ⇒ Task A: Red
- Psychological support ⇒ Task B: Bleu

Fleet of robot to assist them:

- Specialized (2 task A, 3 task B)
- 2 min of energy

Goal :

- Maximize assistance delivered in 3 min
- Test multiple market based method



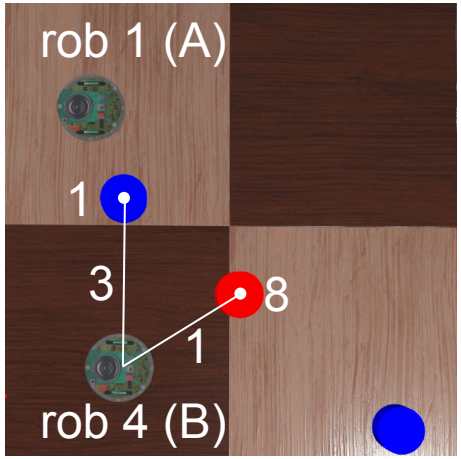
Market Based Algorithm

Auction to find the best fit for a robot :

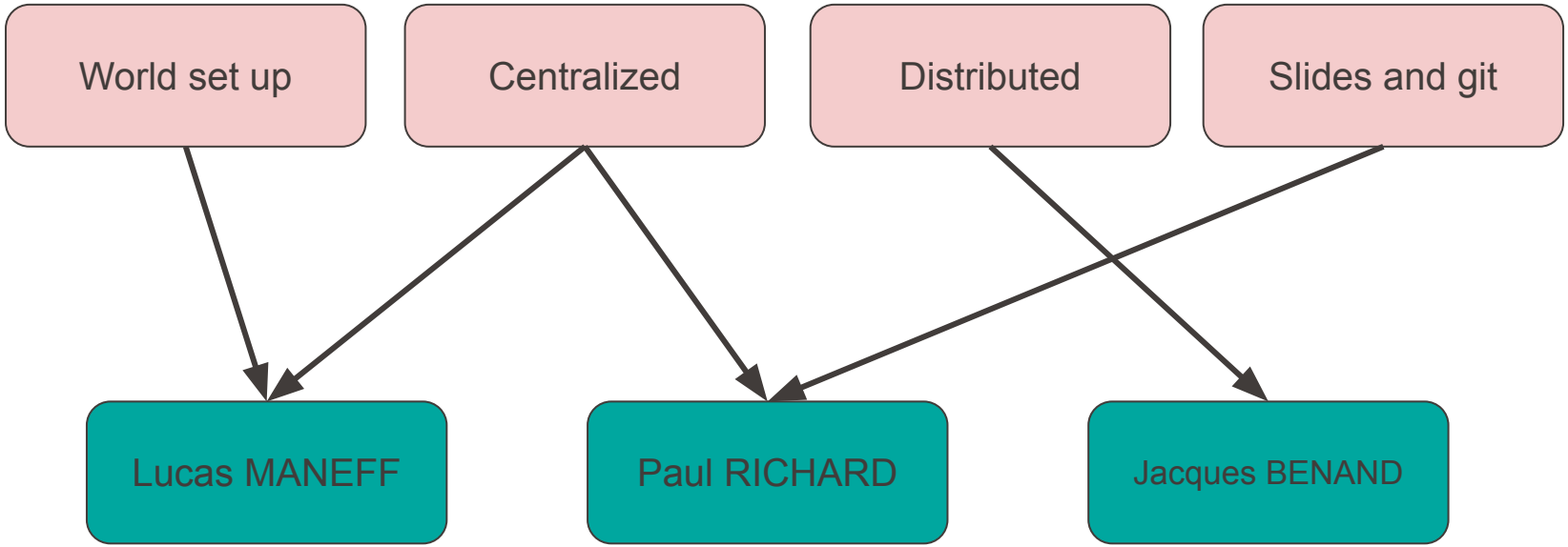
	Centralized	Distributed
Bid	Robots	Robots
Auction	Supervisor	Robots

Bid Calculation (same for all methods) :

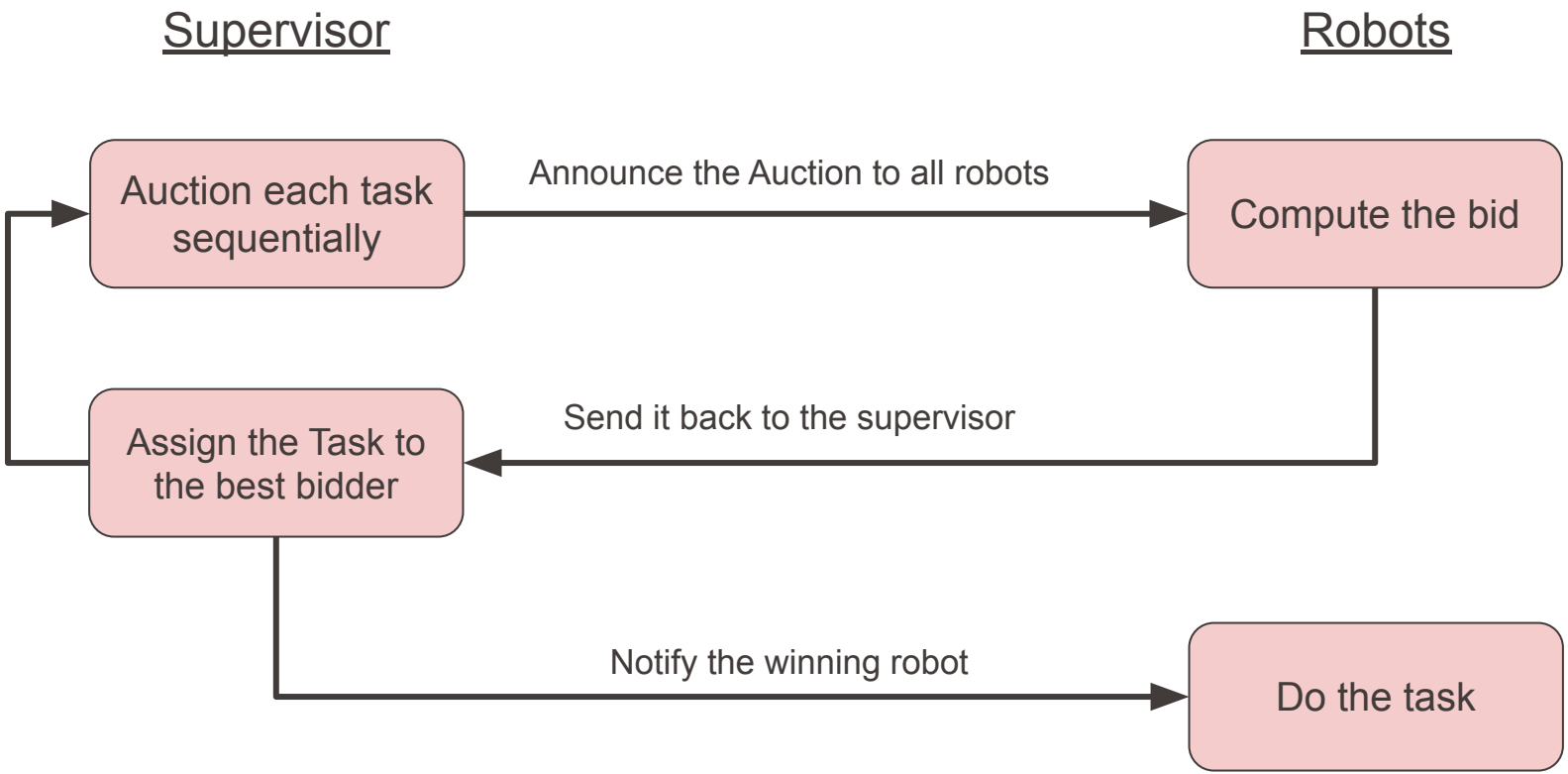
Bid = Time to go to task + Time to do Task



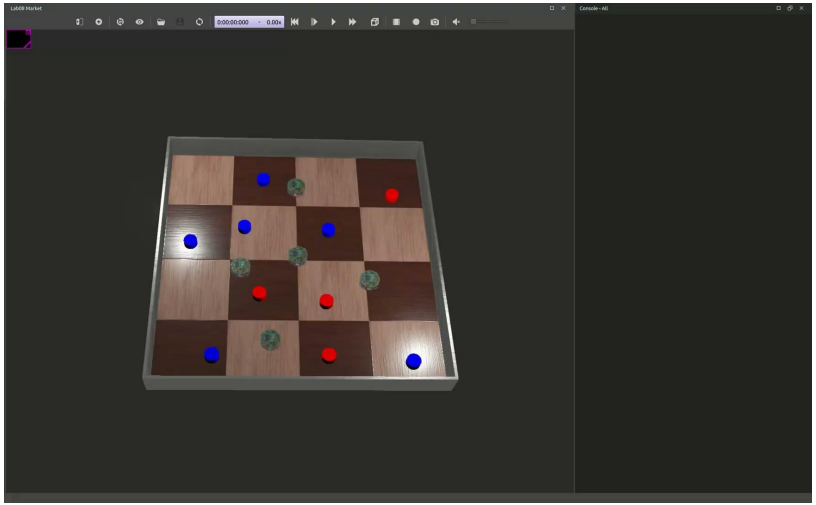
Contribution

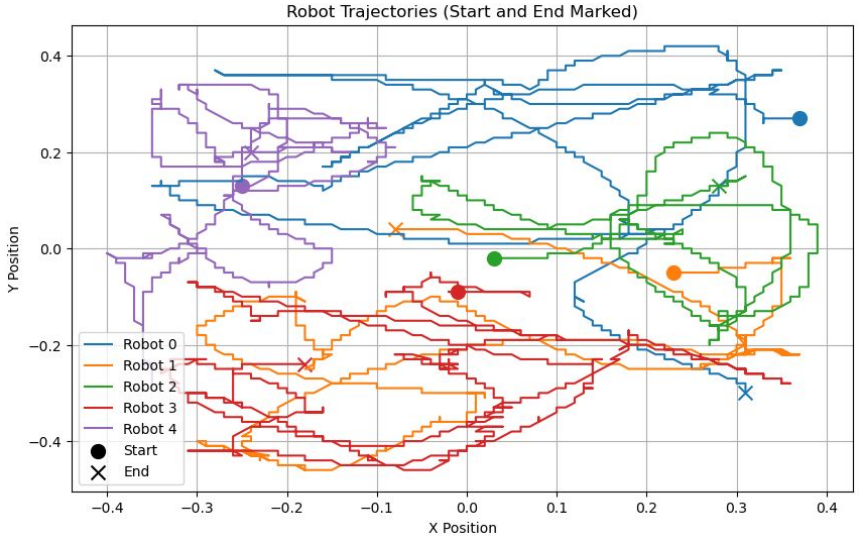


Centralized

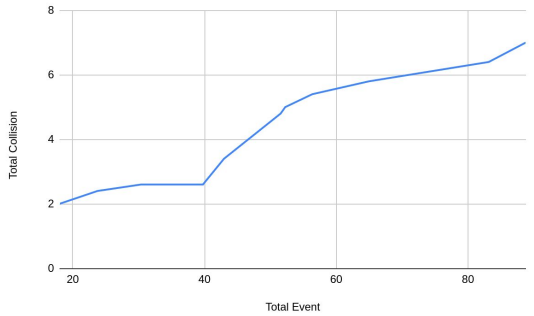


Centralized

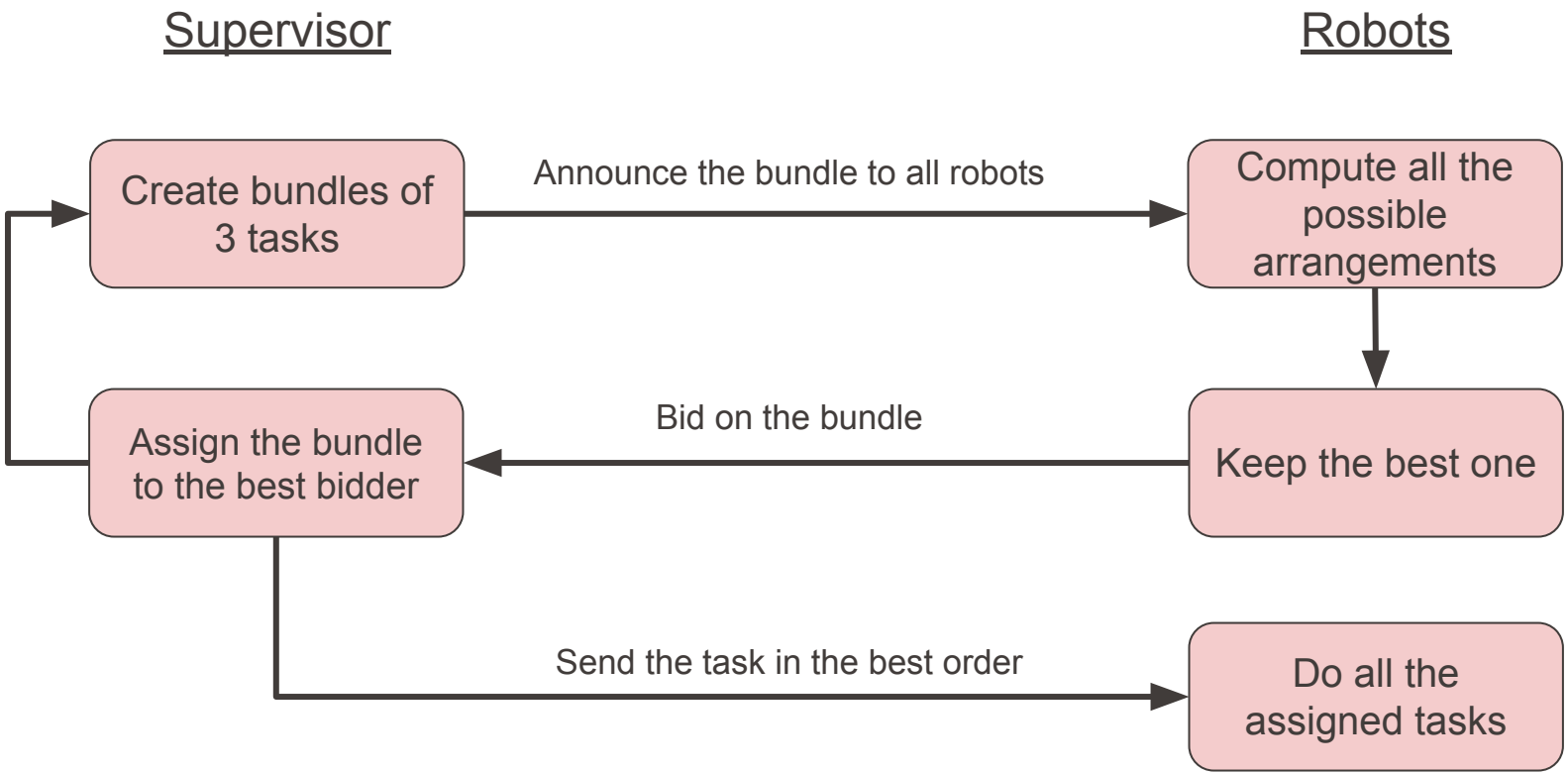




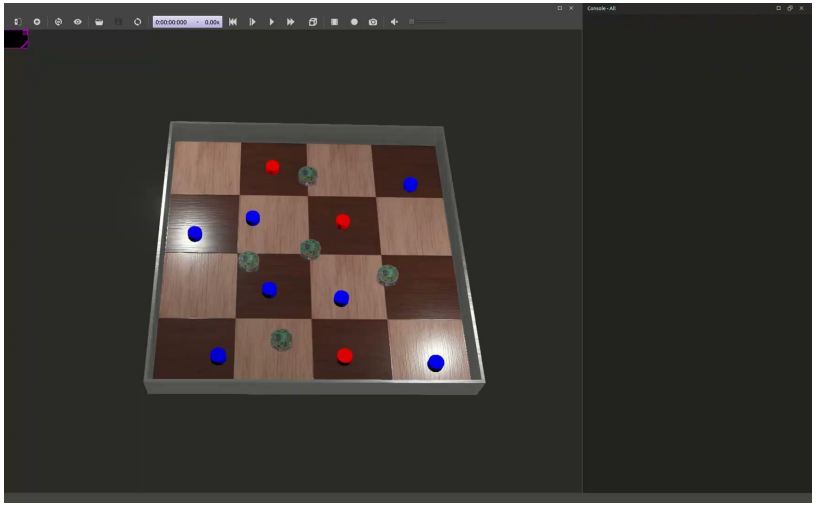
	Collision	Event Handled	Activation Time
Mean	7	88.8	55.53 %
Std	2.45	13.54	4.36 %

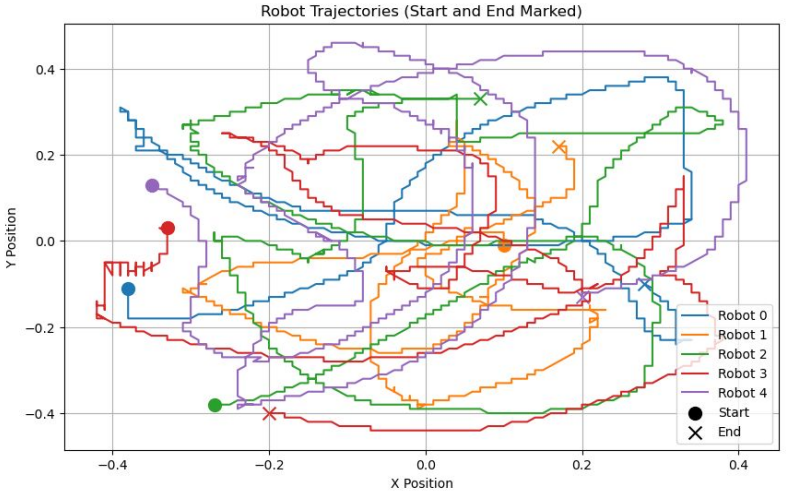


Centralized multi step planning



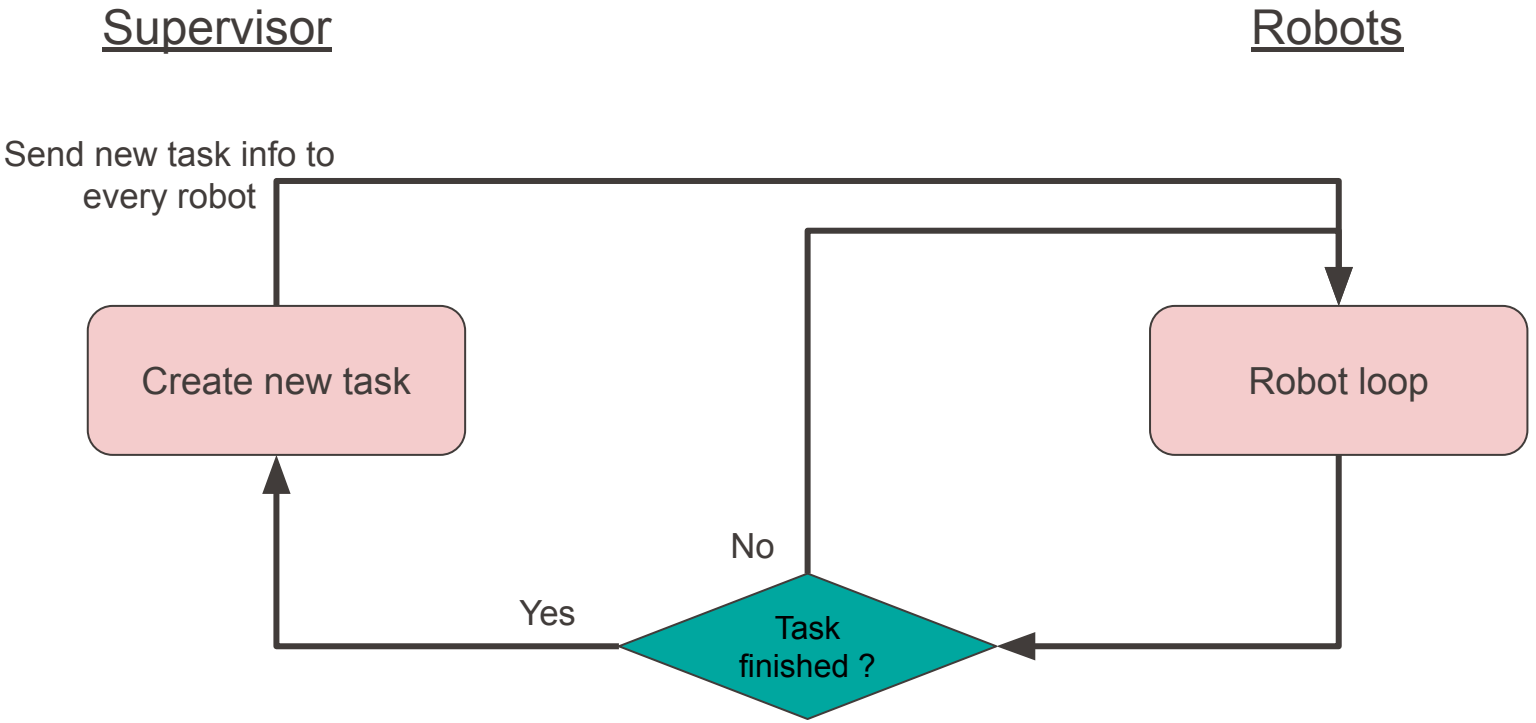
Centralized multi step planning





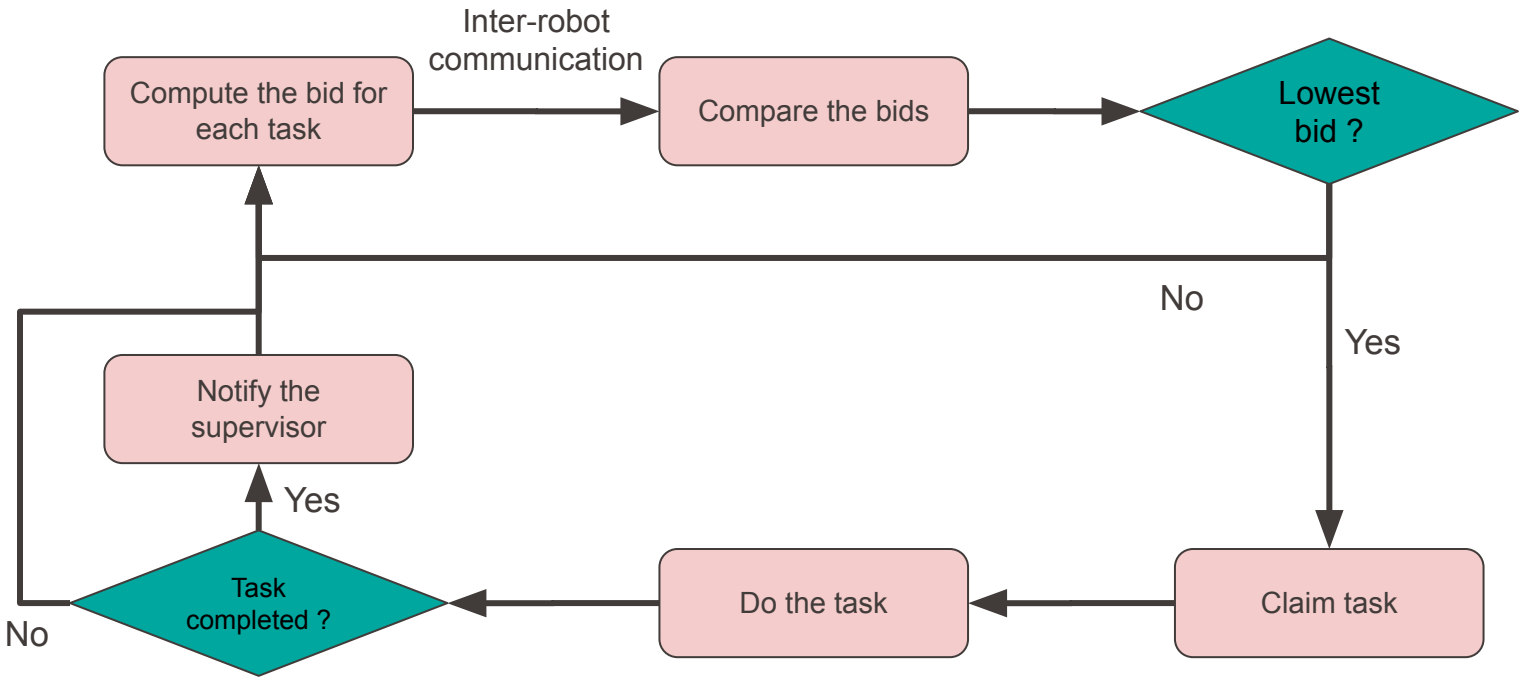
	Collision	Event Handled	Activation Time
Mean	13	60.8	63.43 %
Std	2.73	7.05	3.67 %

Distributed

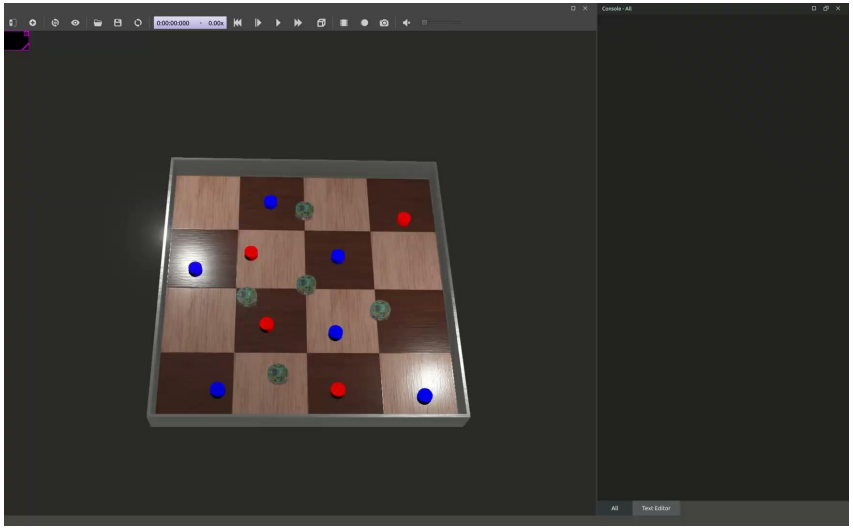


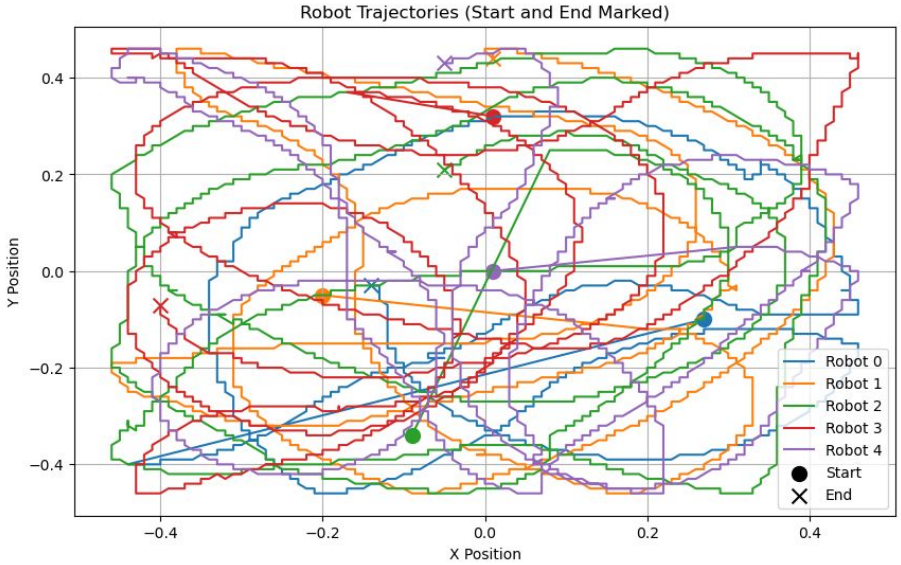
Distributed

Robot loop



Distributed

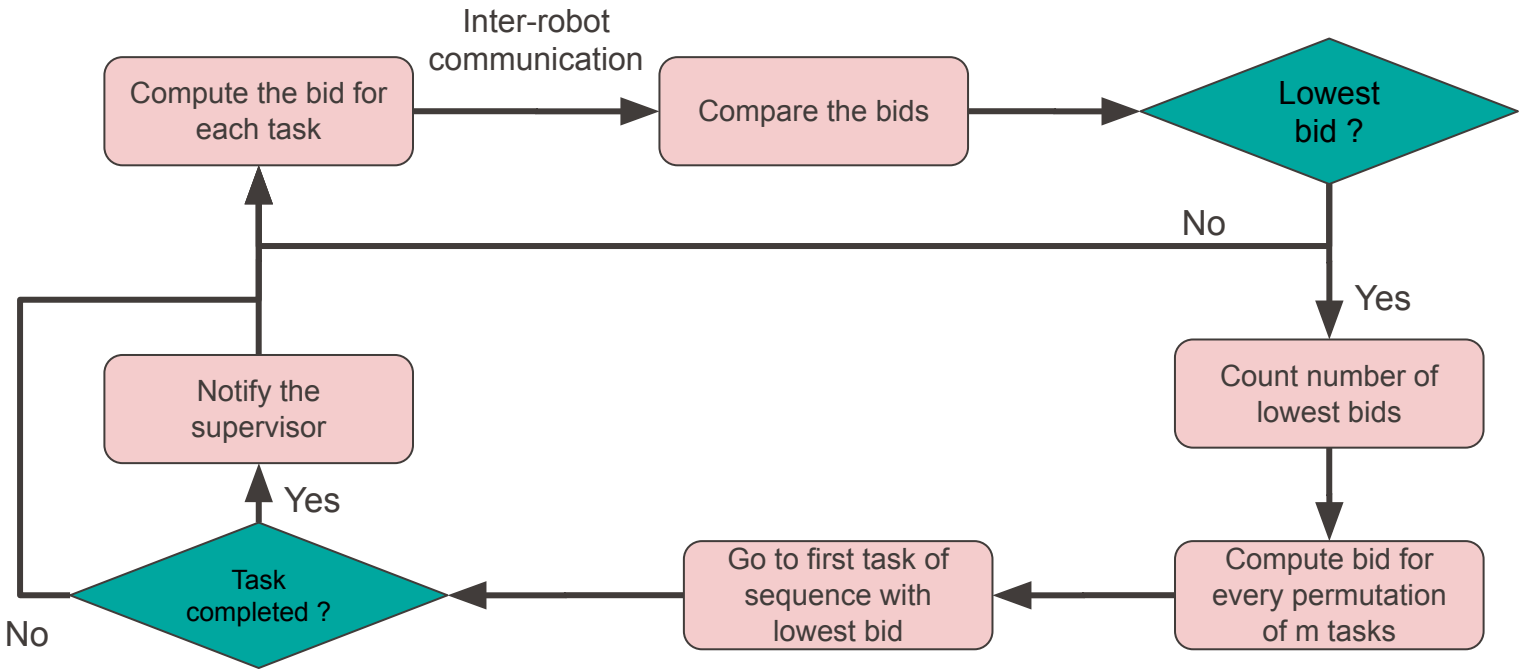




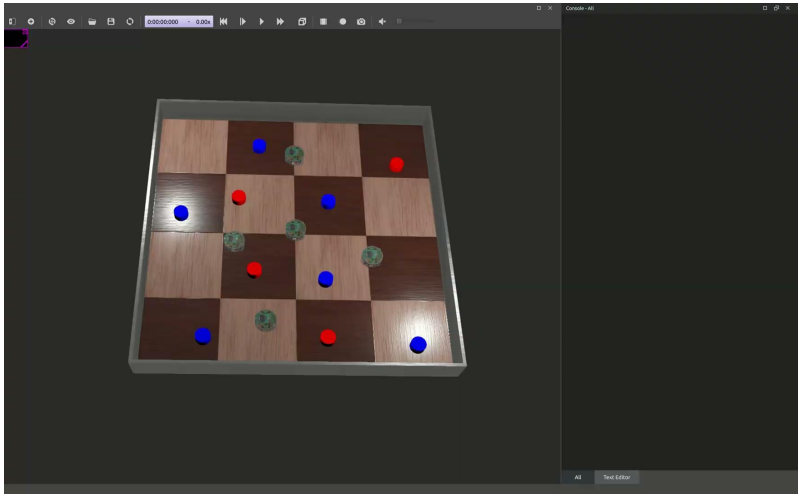
	Collision	Event Handled	Activation Time
Mean	14.4	71.8	62.68 %
Std	2.06	6.68	4.10 %

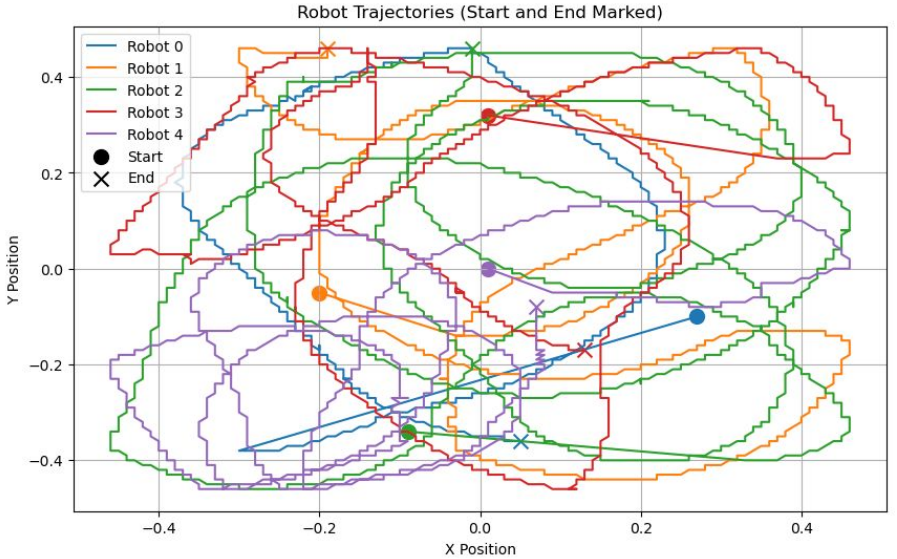
Distributed multi step planning

Robot loop



Distributed multi step planning

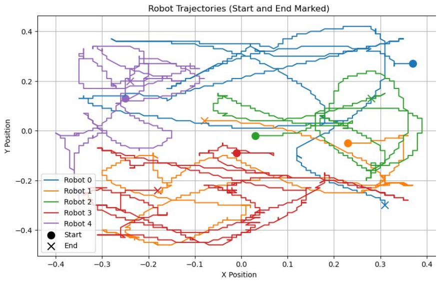


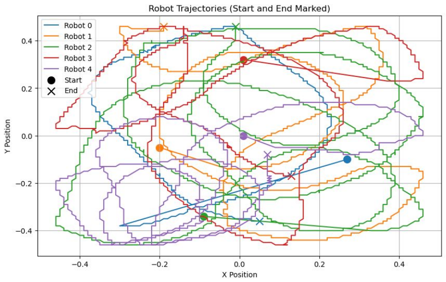


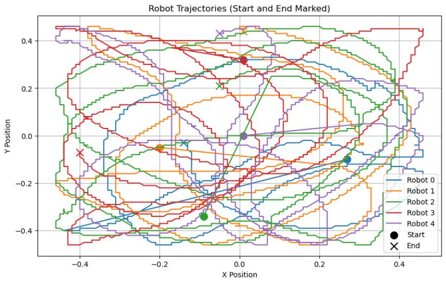
	Collision	Event Handled	Activation Time
Mean	18.8	80.60	64.61 %
Std	4.26	5.50	4.67 %

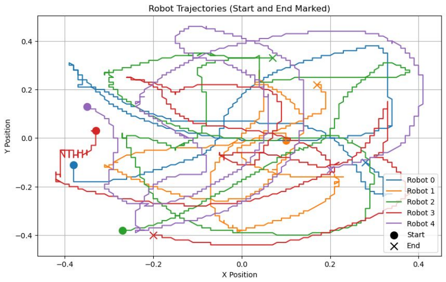
Conclusion

	Centralized	Centralized planned	Distributed	Distributed planned
Collision	7	13	14.4	18.8
Event Handled	88.8	60.8	71.8	80.6
Activation time	55.53 %	63.43 %	62.68 %	64.61 %









Thank you for your attention !