IMIC
Intelligent Manufacturing International Contest

IMIC'25 Flexibac problem Simulator's user manual

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Work overview

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Inputs

- *Scenario parameters*
- *List of input dates and destinations of the boxes incoming in buffer A*

MODEL

TO DO

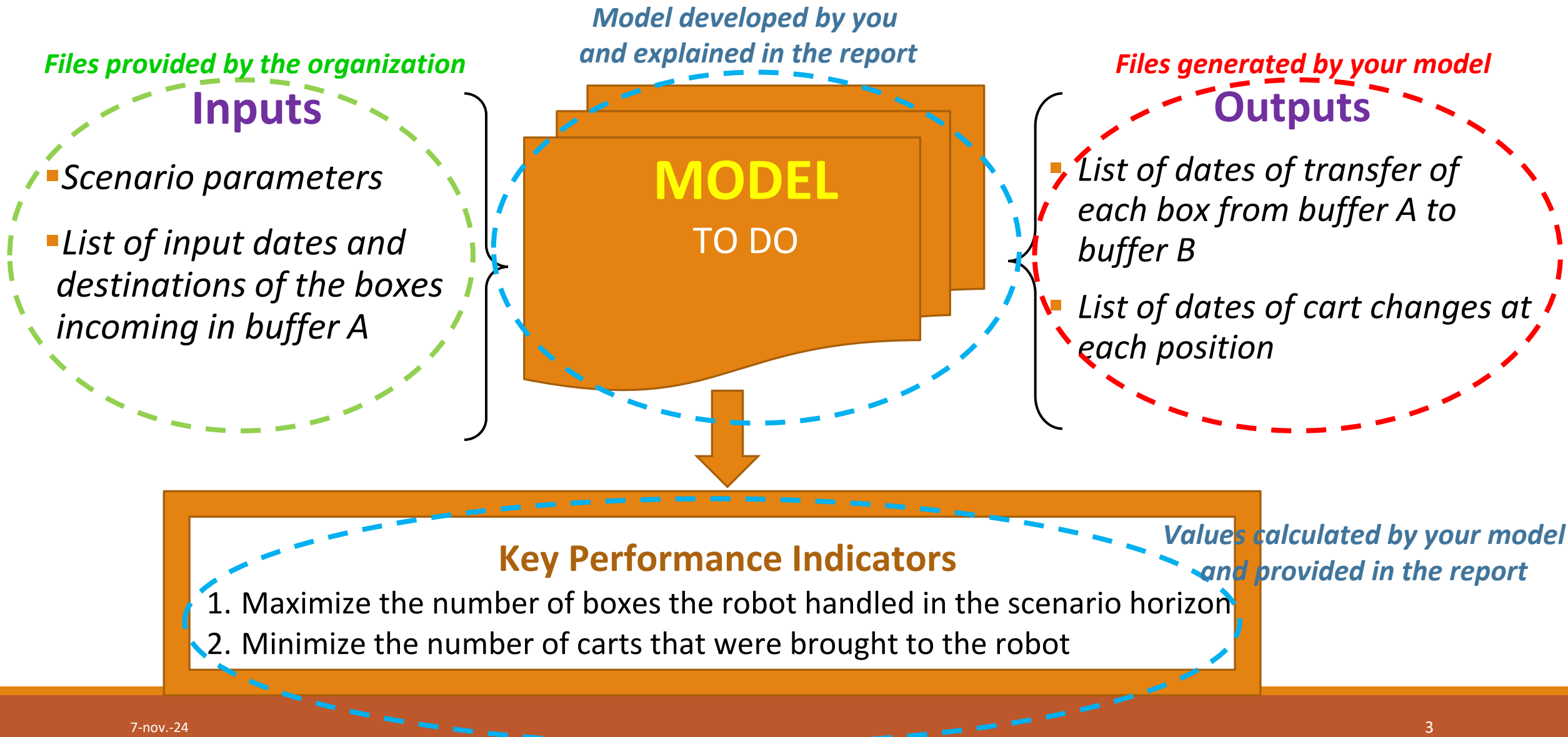
Outputs

- *List of dates of transfer of each box from buffer A to buffer B*
- *List of dates of cart changes at each position*

Key Performance Indicators

1. Maximize the number of boxes the robot handled in the scenario horizon
2. Minimize the number of carts that were brought to the robot

Work overview



A simulator to check your results

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- Model developed in Flexsim
- Made available to the community, freely usable without license
- Used to check the solutions proposed by the contestants
  - KPI values
  - Constraint violation

KPI 1

Containers successfully treated

Buffer	Final content
Robotized	7
ToManual	13

Constraints

Containers unsuccessfully treated

Buffer	Final content	Maximum content
BufferA	5	11
BufferB	6	7
C1	0	3
C2	5	5
C3	4	4
C4	2	2
C5	6	6
C6	6	6
C7	5	5
C8	0	0
C9	0	2
C10	1	2

Amax measured
Bmax measured
Qmax measured

Maximum capacity of BufferA:	Value: 101Type: Integer
Maximum capacity of BufferB:	Value: 11Type: Integer
Maximum capacity of carts C:	Value: 16Type: Integer
Number of carts:	Value: 10Type: Discrete

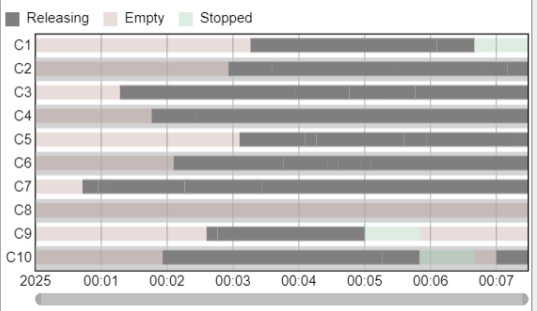
Amax target
Bmax target
Qmax target
Nc

KPI 2

Number of cart changes

Name	Current
NumberofChanges	3

State Gantt



Prerequiste : Flexsim installation

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- Freely downloadable on :

https://www.flexsim.com

- Click on « Try Flexsim free »
- Create your user account
- Download the current Flexsim version

<u>Note:</u> to be comfortable with Flexsim usage, constestants are advised to do the first tutorials.

The input files

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input.dat

```
1;Dvzv;617;¶
2;Zcdj;758;¶
3;Kkvo;203;¶
4;Czcz;104;¶
5;Kowm;287;¶
6;Kkvo;654;¶
7;Nqbq;179;¶
8;Nlfs;119;¶
9;Kkvo;410;¶
```

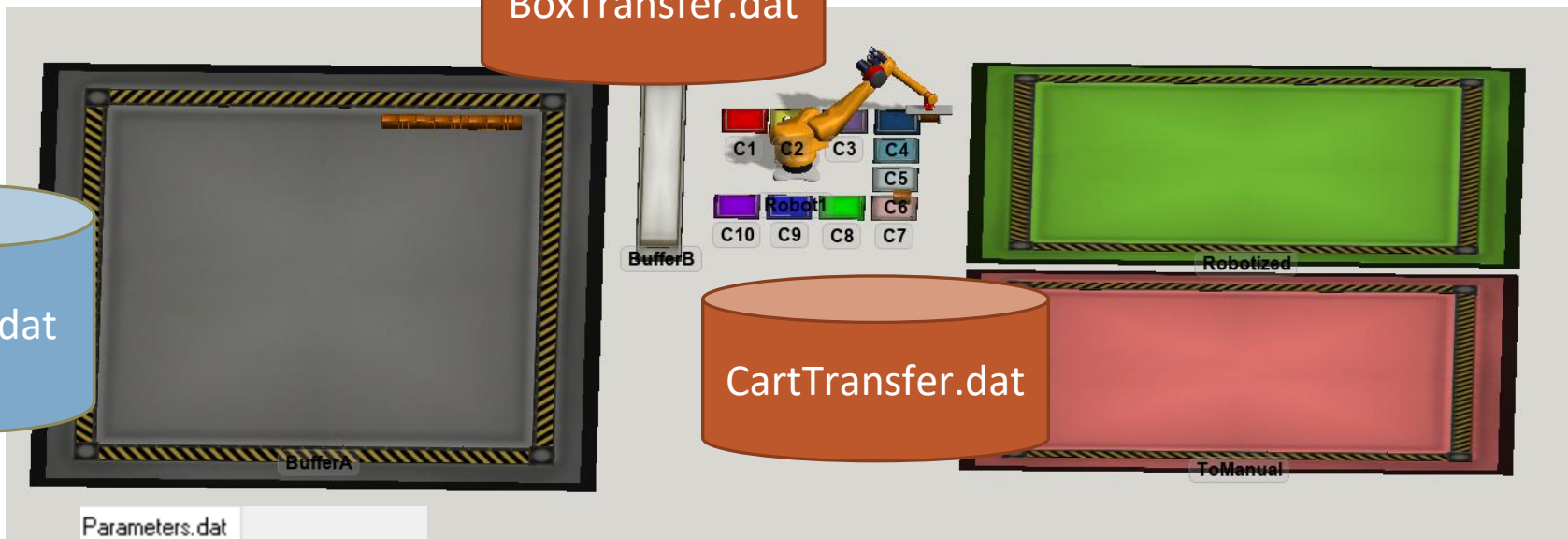
BoxID

Box Destination

Date of entrance in Buffer A

Input.dat

BoxTransfer.dat



CartTransfer.dat

Parameters.dat

Parameters.dat

```
Amax;101;¶
Bmax;11;¶
Tp;10;¶
Qmax;16;¶
Tc;50;¶
EndDate;1001;¶
Nc;10;¶
```

Parameter name

Parameter value

The output files

BoxID *(see input file)*

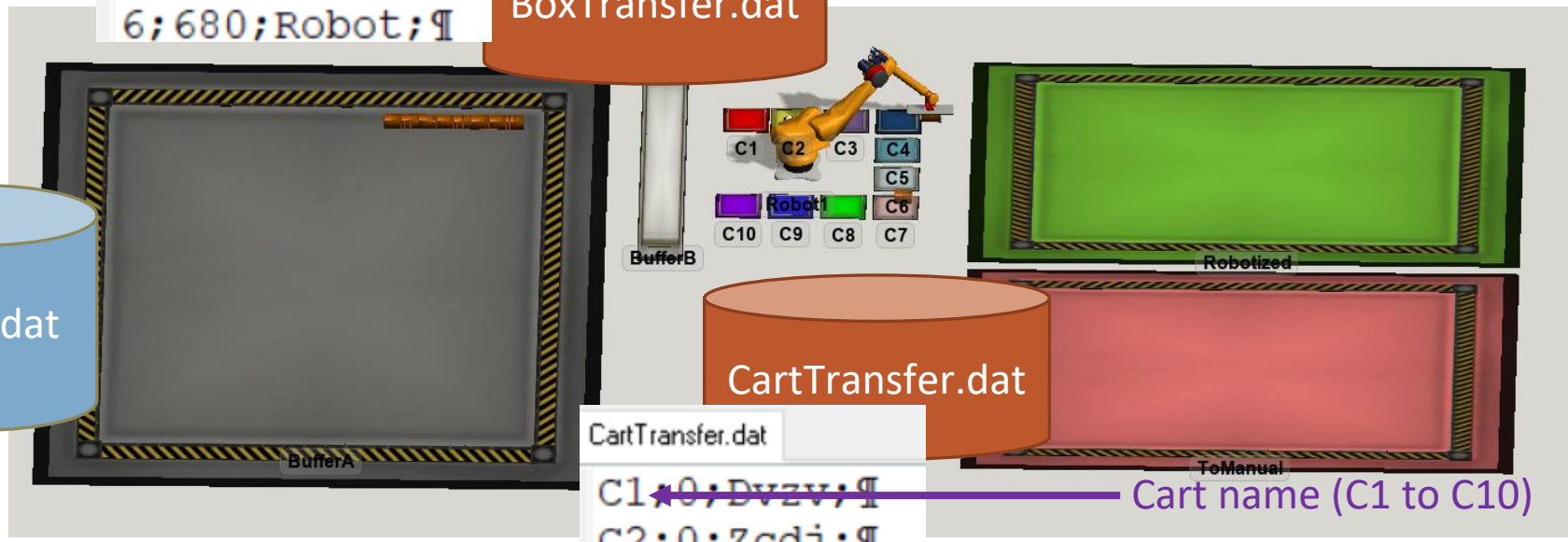
Date of movement from A to B

Box Destination

BoxTransfer.dat *

```
1;648;Robot;¶
2;759;Robot;¶
3;218;Robot;¶
4;132;Manual;¶
5;332;Manual;¶
6;680;Robot;¶
```

BoxTransfer.dat



Input.dat

CartTransfer.dat

CartTransfer.dat *

```
C1;0;Dvzv;¶
C2;0;Zcdj;¶
C3;0;Kkvo;¶
C4;0;Czcz;¶
C5;0;Kowm;¶
C6;0;Nqbq;¶
```

Cart name (C1 to C10)

Date of beginning of cart change; new cart will be available immediately if first change, otherwise Tc seconds later

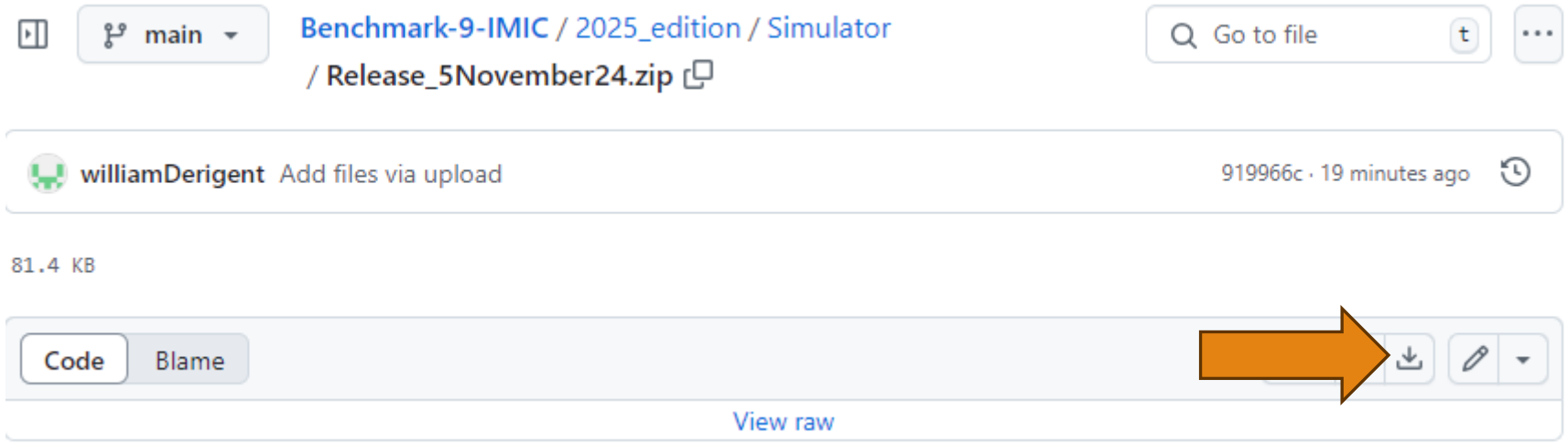
New destination after the change

Parameters.dat

A semicolon (;) at the end of each line!

Getting the simulation model

- Download and unpack the archive

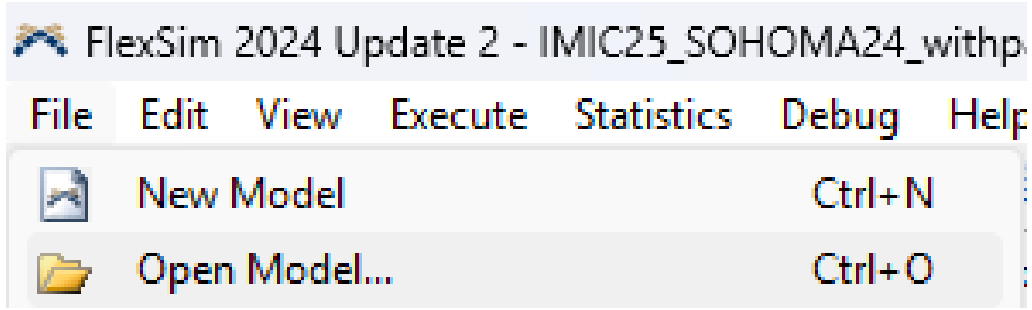


- Open the simulation model “IMIC25_SOHOMA24_withparameters.fsm” included in the archive folder.

Opening the simulation model

- In Flexsim, open the simulation model “IMIC25_SOHOMA24_withparameters.fsm ” included in the archive folder.

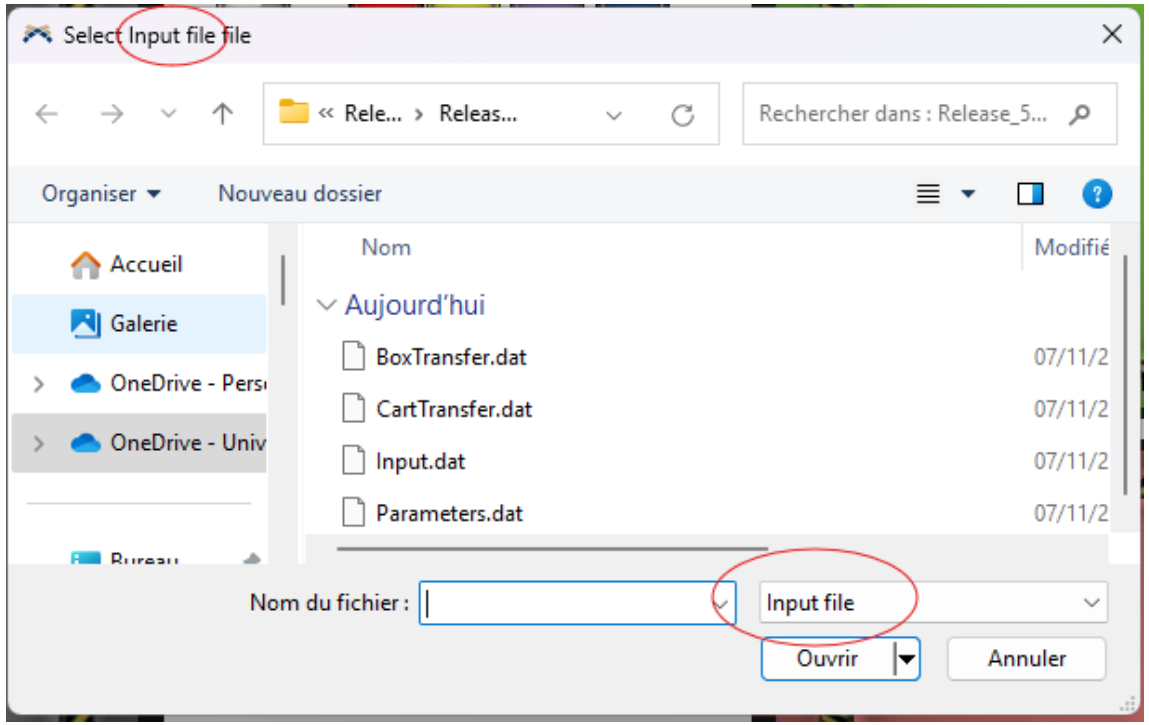
File > Open Model



- Launch the simulation model using the “run” button

Launching the simulation model

- 4 successive windows will pop up, each one asking you to pick a *.dat file.
- Choose the file by looking at the window title (top left) or the file type (bottom right).
- The simulation should then be working properly.



Reading the simulator results

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- **Containers successfully treated:** refers to the containers effectively treated via the robotized or the manual processes.

Containers successfully treated

Buffer	Final content
Robotized	40
ToManual	27

- **Containers unsuccessfully treated:** displays the maximum content of the buffers and carts all along the working period. It can be used to check whether the maximum content has exceeded the authorised values.

Containers unsuccessfully treated

Buffer	Final content	Maximum content
BufferA	0	11
BufferB	0	8
C1	6	6
C2	3	5
C3	2	5
C4	3	3
C5	0	6
C6	3	7
C7	3	6
C8	3	3
C9	5	5
C10	5	5

- **Number of cart changes:** the number of cart changes needed during the working period.

Reading the simulator results

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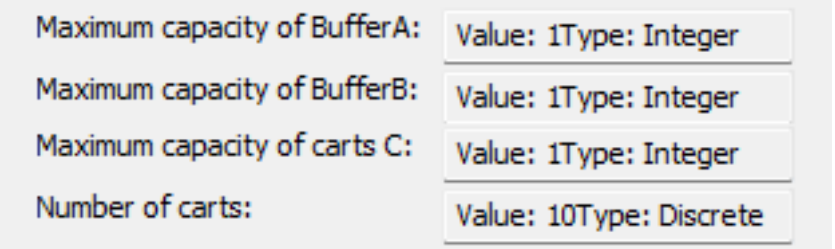
- **Parameter values :** this section displays the maximum capacities of Buffer A, Buffer B and carts C. It also indicates the number of cart slot around the robot.



- **State Gantt:** this Gantt Chart depicts the state of each cart slot.