

CLAIMS

1. A method comprising:

receiving a first request to initiate a set of operations to be run for a queue of substrates at a manufacturing system, wherein each of the set of operations corresponds to a respective substrate process of a set of substrate processes, and wherein one or more operations of the set of operations have one or more time constraints;

identifying a first plurality of candidate substrates of the queue of substrates that are to be processed during the set of operations;

determining a first simulation time period for a first simulation of the set of operations, wherein a size of the first simulation time period corresponds to at least an amount of time associated with a largest time constraint window of a combined set of time constraint windows corresponding to the one or more time constraints prompted by an initiating operation of the set of operations;

running the first simulation of the set of operations to simulate each respective substrate process of the set of substrate processes for the first plurality of candidate substrates over the first simulation time period, wherein the first simulation simulates the set of operations and a condition of an environment of one or more manufacturing equipment during processing according to the one or more operations, and wherein the first simulation generates a first simulation output indicating a first number of candidate substrates that were successfully processed during each of the simulated set of operations to reach an end of the first simulation time period in view of the one or more time constraints;

obtaining a second simulation output by running a second simulation of the successfully processed candidate substrates included in the first simulation output;

performing a verification process by determining whether each successfully processed candidate substrate identified in the first simulation output is included in the second simulation output; and

responsive to determining that each successfully processed candidate substrate identified in the first simulation output is included in the second simulation output, initiating the set of operations at the manufacturing system to process the first number of candidate substrates from the queue of substrates according to each respective substrate process of the set of substrate processes over a time period corresponding to the first simulation time period.

2. The method of claim 1, wherein determining the first simulation time period for the first simulation of the set of operations comprises:

determining the set of time constraint windows based on each of the one or more operations of the set of operations that each have the one or more time constraints; and
identifying, the largest time constraint window of the set of time constraint windows.

3. The method of claim 1, wherein initiating the set of operations at the manufacturing system to process the first number of candidate substrates comprises:

setting a substrate counter value for the a operation of the set of operations to correspond to the first number of candidate substrates, wherein the substrate counter value defines a total number of substrates at the manufacturing system to be initiated at the first operation over the first time period.

4. The method of claim 3, further comprising:

receiving a second request to initiate the set of operations to be run at the manufacturing system;

determining a second plurality of candidate substrates to be processed during the set of operations;

running a third simulation of the set of operations for the second plurality of candidate substrates over a second simulation time period, wherein the third simulation generates a third simulation output indicating a second number of candidate substrates that were successfully processed during each of the simulated set of operations to reach an end of the second simulation time period; and

updating the substrate counter value for the first operation of the set of operations to correspond to the second number of candidate substrates.

5. The method of claim 1, wherein the first simulation further generates a third simulation output indicating an additional substrate processing capacity for a manufacturing equipment of the manufacturing system, the additional substrate processing capacity corresponding to a number of substrates that could be successfully processed at the manufacturing equipment within the first simulation time period, and wherein the method further comprises:

determining, based on the additional substrate processing capacity for the manufacturing equipment, a second number of candidate substrates, wherein the set of operations are initiated to process the first number of candidate substrates and the second number of candidate substrates over the first simulation time period.

6. The method of claim 5, further comprising:
identifying a second plurality of candidate substrates to be processed during the set of operations based on the second number of candidate substrates;
running a third simulation of the set of operations for the first plurality of candidate substrates and the second plurality of substrates over the first simulation time period, wherein the third simulation generates a third simulation output indicating a third number of candidate substrates that were successfully processed during each of the simulated set of operations to reach the end of the first simulation time period; and
determining whether the third number of candidate substrates corresponds to a sum of the first number of candidate substrates and the second number of candidate substrates, wherein the set of operations are initiated to process the first number of candidate substrates and the second number of candidate substrates responsive to a determination that the third number of candidate substrates corresponds to a sum of the first number of candidate substrates and the second number of candidate substrates.
7. The method of claim 1, wherein the one or more time constraints for an operation of the set of operations each comprise an amount of time after completion of the operation that one or more subsequent operations of the set of operations are to be completed.
8. The method of claim 1, wherein the first simulation further simulates actions performed by an operator at the manufacturing system.
9. The method of claim 1, wherein a condition of an environment of the one or more manufacturing equipment comprises at least one of an operating pressure of the one or more manufacturing equipment, an operating temperature of the one or more manufacturing equipment, or a number of substrates being processed using the one or more manufacturing equipment.
10. A system comprising:
a memory; and
a processing device coupled to the memory, the processing device to:
receive a first request to initiate a set of operations to be run for a queue of substrates at a manufacturing system, wherein each of the set of operations

corresponds to a respective substrate process of a set of substrate processes, and wherein one or more operations of the set of operations have one or more time constraints;

identify a first plurality of candidate substrates of the queue of substrates that are to be processed during the set of operations;

determine a first simulation time period for a first simulation of the set of operations, wherein a size of the first simulation time period corresponds to at least an amount of time associated with a largest time constraint window of a combined set of time constraint windows corresponding to the one or more time constraints prompted by initiating operation of the set of operations;

run the first simulation of the set of operations to simulate each respective substrate process of the set of substrate processes for the first plurality of candidate substrates over the first simulation time period, wherein the first simulation simulates the set of operations and a condition of an environment of one or more manufacturing equipment during processing according to the one or more operations, and wherein the first simulation generates a first simulation output indicating a first number of candidate substrates that were successfully processed during each of the simulated set of operations to reach an end of the first simulation time period in view of the one or more time constraints;

obtain a second simulation output by running a second simulation of the successfully processed candidate substrates included in the first simulation output;

perform a verification process by determining whether each successfully processed candidate substrate identified in the first simulation output is included in the second simulation output; and

responsive to determining that each successfully processed candidate substrate identified in the first simulation output is included in the second simulation output, initiate the set of operations at the manufacturing system to process the first number of candidate substrates from the queue according to each respective substrate processes over a time period corresponding to the first simulation time period.

11. The system of claim 10, wherein to determine the first simulation time period of the set of operations, the processing device is further to:

determine the set of time constraint windows based on each of the one or more operations of the set of operations that each have the one or more time constraints; and

identify, the largest time constraint window of the set of time constraint windows.

12. The system of claim 10, wherein to initiate the set of operations at the manufacturing system to process the first number of candidate substrates, the processing device is to:

set a substrate counter value for a first operation of the set of operations to correspond to the first number of candidate substrates, wherein the substrate counter value defines a total number of substrates at the manufacturing system to be initiated at the first operation over the first time period.

13. The system of claim 12, wherein the processing device is further to:

receive a second request to initiate the set of operations to be run at the manufacturing system;

determine a second plurality of candidate substrates to be processed during the set of operations;

run a third simulation of the set of operations for the second plurality of candidate substrates over a second simulation time period, wherein the third simulation generates a third simulation output indicating a second number of candidate substrates that were successfully processed during each of the simulated set of operations to reach an end of the second simulation time period; and

update the substrate counter value for the first operation of the set of operations to correspond to the second number of candidate substrates.

14. The system of claim 10, wherein the first simulation further generates a third simulation output indicating an additional substrate processing capacity for a manufacturing equipment of the manufacturing system, the additional substrate processing capacity corresponding to a number of substrates that could be successfully processed at the manufacturing equipment within the first simulation time period, and wherein the processing device is further to:

determine, based on the additional substrate processing capacity for the manufacturing equipment, a second number of candidate substrates, wherein the set of operations are initiated to process the first number of candidate substrates and the second number of candidate substrates over the first simulation time period.

15. The system of claim 14, wherein the processing device is further to:

identify a second plurality of candidate substrates to be processed during the set of operations based on the second number of candidate substrates;

run a third simulation of the set of operations for the first plurality of candidate substrates and the second plurality of substrates over the first simulation time period, wherein the third simulation generates a third simulation output indicating a third number of candidate substrates that were successfully processed during each of the simulated set of operations to reach the end of the first simulation time period; and

determine whether the third number of candidate substrates corresponds to a sum of the first number of candidate substrates and the second number of candidate substrates, wherein the set of operations are initiated to process the first number of candidate substrates and the second number of candidate substrates responsive to a determination that the third number of candidate substrates corresponds to a sum of the first number of candidate substrates and the second number of candidate substrates.

16. The system of claim 10 wherein the one or more time constraints for an operation of the set of operations each comprise an amount of time after completion of the operation that one or more subsequent operations of the set of operations are to be completed.

17. A non-transitory computer readable storage medium comprising instructions that, when executed by a processing device, cause the processing device to:

receive a first request to initiate a set of operations to be run for a queue of substrates at a manufacturing system, wherein each of the set of operations corresponds to a respective substrate process of a set of substrate processes, and wherein one or more operations of the set of operations have one or more time constraints;

identify a first plurality of candidate substrates of the queue of substrates that are to be processed during the set of operations;

determine a first simulation time period for a first simulation of the set of operations, wherein a size of the first simulation time period corresponds to at least an amount of time associated with a largest time constraint window of a combined set of time constraint windows corresponding to the one or more time constraints prompted by an initiating operation of the set of operations;

run the first simulation of the set of operations to simulate each respective substrate process of the set of substrate processes for the first plurality of candidate substrates over the first simulation time period, wherein the first simulation simulates the set of operations and a

condition of an environment of one or more manufacturing equipment during processing according to the one or more operations, and wherein the first simulation generates a first simulation output indicating a first number of candidate substrates that were successfully processed during each of the simulated set of operations to reach an end of the first simulation time period in view of the one or more time constraints;

obtain a second simulation output by running a second simulation of the successfully processed candidate substrates included in the first simulation output;

perform a verification process by determining whether each successfully processed candidate substrate identified in the first simulation output is included in the second simulation output; and

responsive to determining that each successfully processed candidate substrate identified in the first simulation output is included in the second simulation output, initiate the set of operations at the manufacturing system to process the first number of candidate substrates from the queue of substrates according to each respective substrate process of the set of substrate processes over a time period corresponding to the first simulation time period.

18. The non-transitory computer readable storage medium of claim 17, wherein to determine the first simulation time period for the first simulation of the set of operations, the processing device is further to:

determine the set of time constraint windows based on each of the one or more operations of the set of operations that each have the one or more time constraints; and

identify, the largest time constraint window of the set of time constraint windows.

19. The non-transitory computer readable storage medium of claim 17, wherein to initiate the set of operations at the manufacturing system to process the first number of candidate substrates, the processing device is to:

set a substrate counter value for the first operation of the set of operations to correspond to the first number of candidate substrates, wherein the substrate counter value defines a total number of substrates at the manufacturing system to be initiated at the first operation over the first time period.

20. The non-transitory computer readable storage medium of claim 19, wherein the processing device is further to:

receive a second request to initiate the set of operations to be run at the manufacturing system;

determine a second plurality of candidate substrates to be processed during the set of operations;

run a third simulation of the set of operations for the second plurality of candidate substrates over a second simulation time period, wherein the third simulation generates a third simulation output indicating a second number of candidate substrates that were successfully processed during each of the simulated set of operations to reach an end of the second simulation time period; and

update the substrate counter value for the first operation of the set of operations to correspond to the second number of candidate substrates.