HIERARCHY OF PRODUCTION DECISIONS

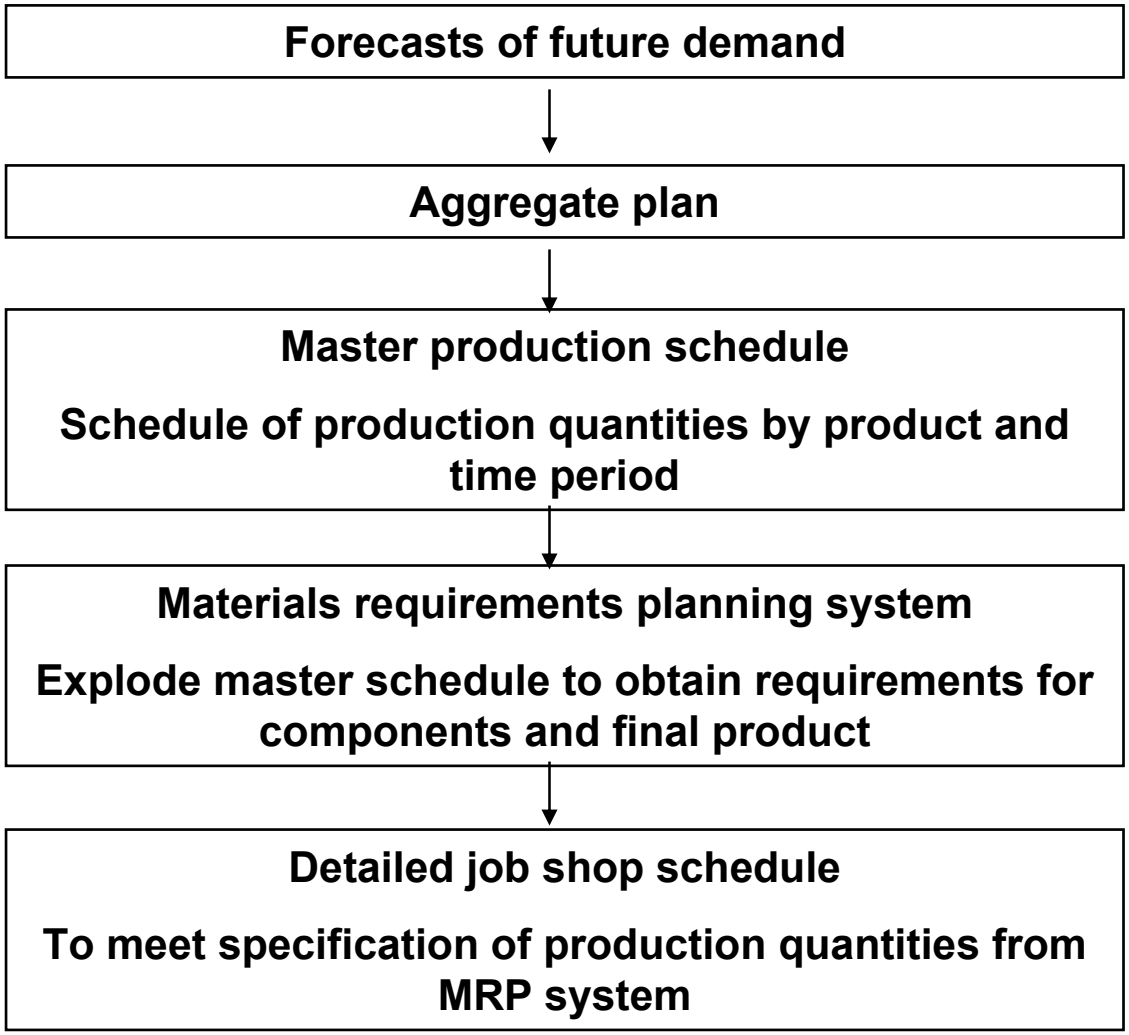


FIGURE 1

Comparison of Different Scheduling Approaches

	OPTIMAL	SIMULATION	HEURISTIC	MIXED
HOLD TIME		X	X	X
QUEUE TIME		X	X	X
CUSTOMER SERVICE		X		X
FORCAST BIAS		X		X
SET-UP COST	X		X	X
HOLDING COST	X		X	X
OVERTIME COST	X		X	X
CAPACITY	X		X	X
PRODUCTION LOT SIZING	X	L	X	X
PRODUCTION SEQUENCE	X	L	X	X
CUSTOMER DUE DATE	X	X	X	X
FAMILY STRUCTURE	X			X

X = Functional
L = Limited

Visual Interactive Simulation Attributes:

- *Visual output*: portraying the dynamic behavior of the model
- *User Interaction*: allowing the user to interact with the running model
- *Visual Input*: where a model can be created visually instead of being data driven

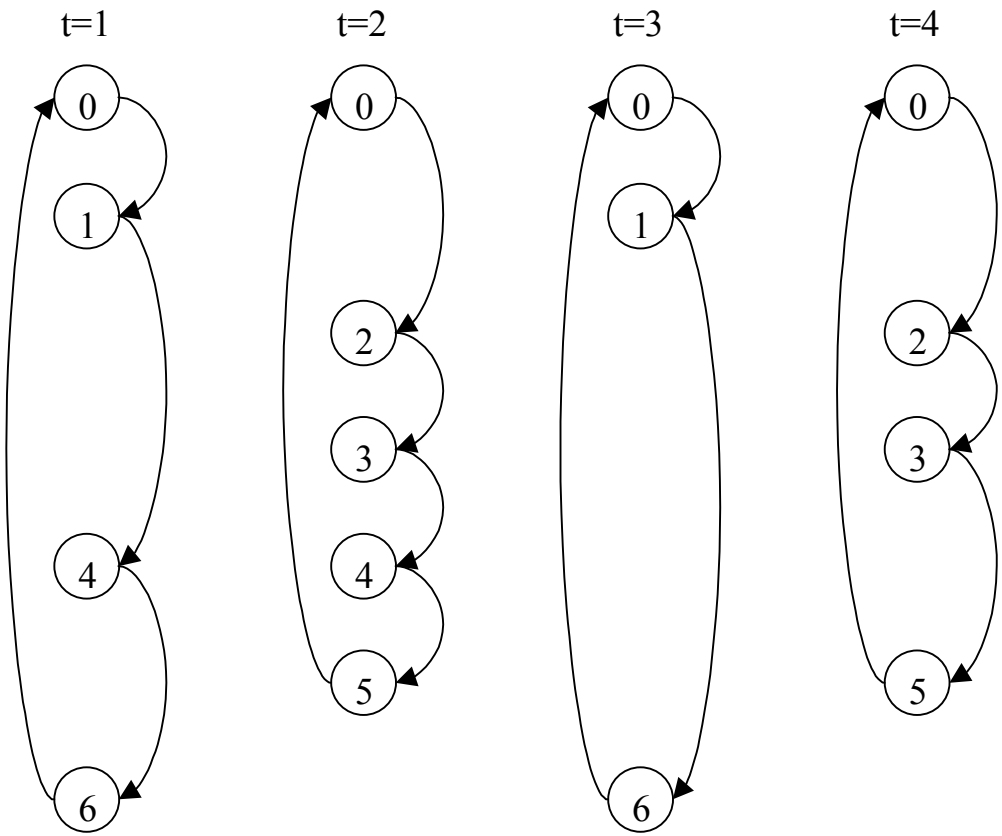
Finite Capacity and Sequencing

- Very important problem
- Hard to get the “best” solution
- We use a two step approach with success
- Nearest neighbor with variable origin heuristic

Table 1. Set-up Cost Matrix

From State	To State[**] 0	1	2	3	4	5	6
0 (Process Idle)	*	150	110	120	100	130	100
1 (White Grape)	150	*	90	100	100	150	100
2 (Fruit Harvest)	110	500	*	500	500	500	500
3 (Grape Juice)	100	200	70	*	100	200	100
4 (Grape Apple)	100	200	70	100	*	500	100
5 (Harvest Blend)	150	150	90	100	100	*	100
6 (Grape Raspberry)	100	200	70	100	100	200	*

[**]State numbers are used to simplify the discussion.


t=1
0
1
4
6
t=2
0
2
3
4
5
t=3
0
1
6
t=4
0
2
3
5

Capacitated MRP

- Huge area for future research
- Integration of the supply chain
- Implementation issues
- New mathematical ideas on “optimal” cost solutions for finite capacity

Safety Stock Planning and Forecast Bias

- Forecast error seldom is normally distributed
- There are few finite planning models that include safety stock
- Mathematical models account for bias