TURKISH AVIATION ACADEMY

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OPERATİONS & LOGİSTİCS MANAGEMENT İN AİR TRANSPORTATİON

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M.Sc. Program

Air Transportation Systems and Infrastructure

Strategic Planning

Case Study : 9 June 2014

Case Study:

Kristen Cookies

LEARNİNG OBJECTİVES

- Primary:
  - Introductory activity to the basics of process analysis:
    - Set- up times
    - Throughput times
    - cycle time
    - …
- Secondary:
  - Gantt charts

OVERVİEW

- You are about to open a two-person midnight cookie baking operation which involves several stages:

Mixing (6min – up to 3 dozens)

you

Spoon (2min/doz) you

Load & Bake (1+9min/doz)

roommate

Unload

Cool off (5min)

Packing (2min)

roommate

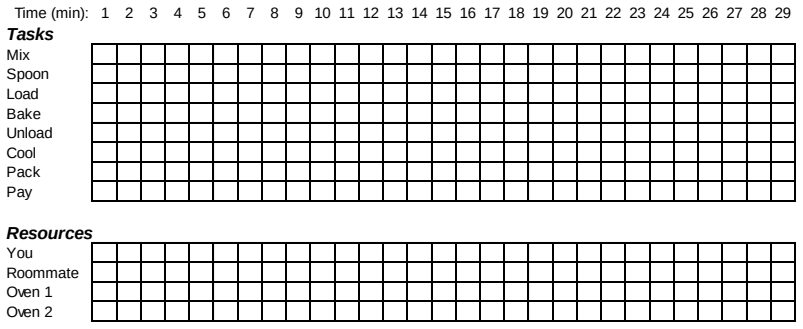
Payment (1min)

roommate

KRİSTEN'S COOKİE DİSCUSSİONS

1. How long will it take to fill a rush order?
2. How many orders can you fill in a night (4 hours)?
3. How much of your own and your roommate's time will it take to fill each order?
4. Any discount for two-dozen orders? Will it take you any longer to fill a two-dozen order than a one-dozen order?
5. How many food processors? Baking trays?
6. Any change to the production plans? Bottleneck? Another oven?

- Use the Gantt chart template



KRİSTEN'S COOKİE
LİNEAR FLOW CHART

Answer

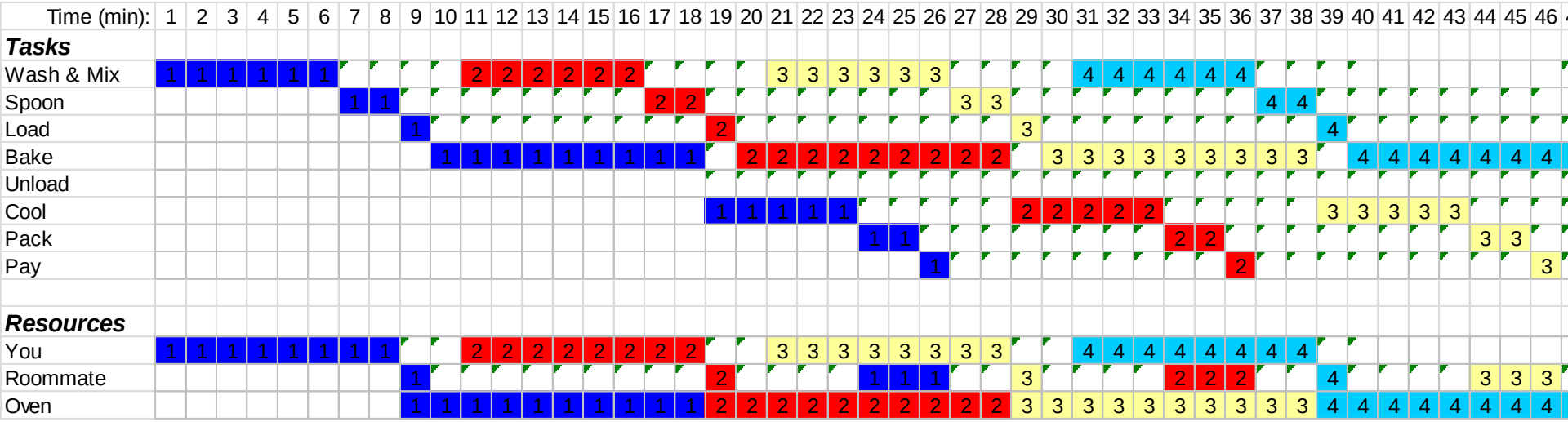
Mix & Spoon	Load oven, set timer and begin bake	Continue to bake	Cool	Pack		Receive Payment
8 min min	1 min	9 min	5 min	2 min	hold	1

| total baking time = 10 min|

KRİSTEN'S COOKİE
SWİM-LANE (DEPLOYMENT) FLOW CHART

Resources	Activities
You	Mix → Spoon
Roommate Oven	Load
Oven	Bake
	Cool
Roommate	Pack → Pay

KRİSTEN'S COOKİE GANTT CHART



Time (min):	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Tasks																																															
Wash & Mix	1	1	1	1	1	1					2	2	2	2	2	2					3	3	3	3	3	3					4	4	4	4	4	4										
Spoon							1	1									2	2									3	3									4	4								
Load									1										2										3										4								
Bake										1	1	1	1	1	1	1	1	1		2	2	2	2	2	2	2	2	2		3	3	3	3	3	3	3	3	3		4	4	4	4	4	4	4
Unload																																														
Cool																			1	1	1	1	1						2	2	2	2	2						3	3	3	3	3				
Pack																								1	1									2	2									3	3		
Pay																										1										2										3
Resources																																														
You	1	1	1	1	1	1	1	1			2	2	2	2	2	2	2	2			3	3	3	3	3	3	3	3			4	4	4	4	4	4	4	4								
Roommate									1										2					1	1	1			3					2	2	2			4					3	3	3
Oven									1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4

1. How long will it take to fill a rush order?

This is **throughput** time and equals 26 minutes

2. How many orders can you fill in a night (4 hours)?

What are you looking for to determine the answer?

Capacity! Capacity is the bottleneck (slowest stage) = baking time = 10 minutes

Cycle time for system is = cycle time for bottleneck

In 4 hours can make **24 orders** (6 per hour (since 10 minutes each) and 4 hrs)

BUT may need time for set up and clean up therefore conservatively 22 dozen (concept of effective capacity)

3. How much of your own and your roommate's time will it take to fill each order?

This is labour time: baking is bottleneck, therefore other activities have excess capacity (idle time)

For a 1 dozen cookie order total Labour time = **12 min**

In each cycle you are working 8 minutes and you roommate works 4 minutes

4. Any discount for two-dozen orders? Will it take you any longer to fill a two-dozen order than a one-dozen order?

No discounts, why? **Bottleneck operations capacity is independent of order size**.

For example, 2 orders: mixing takes 10 minutes (6 min mix, 4 min for spooning out to **2** trays), **Baking still takes 10 min per dozen**.

5. How many food processors? Baking trays?

1 processor since baking is bottleneck

but

several trays:1 in oven, 1 being prepared for oven, 1 cooling

6. Any change to improve the production plans? Bottleneck? Another oven?

To remove bottleneck: add an oven (therefore now 2 ovens)
Thus, capacity increases from 6 doz per hour to 12 doz per hour.

Mix and spoon	7.5 per hour
Bake	12 per hour
Cool	5 minutes
Pack	30 per hour
Receive $$	60 per hour

Where is bottleneck now??

Mix & spoon therefore capacity is 7.5 doz cookies per hour