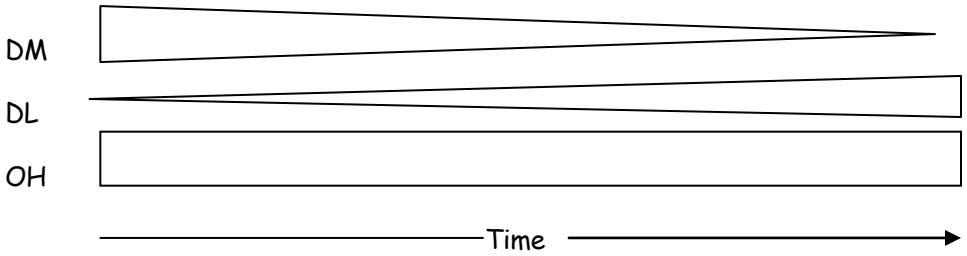
I. **Process Costing**: Used to allocate costs to Work-In-Process (WIP) and finished goods (and provide a basis to estimate the cost to complete work) for homogeneous products

A. The Basic Process Costing Model: Computation of Equivalent Units (EU) of Production

- Estimates are based on three parameters (factors of production): DM, DL,OH
- Cost allocation models must account for the fact that the factors of production are applied unevenly.



Example 1:**Simple Example, One department several process:**
Assume the LBSU incurred the following costs for the period:

DM:	$ 78,000
DL	104,000
OH	30,000
	$ 212,000

Additional Data:

Process	A	B	C	D	FG	∑
# units in Production →	20	20	20	20	20	100
% Completion:						
DM	50%	70%	80%	90%	100%	
DL	20%	30%	40%	70%	100%	
OH	2-%	40%	60%	80%	100%	

- One hundred units were started in process and 20 units were finished
  LBSU has four production departments (A,B,C,D) and a finished goods (FG) department

Requirements:
1. Compute cost per finished unit
2. Identify the DM, DL and OH components contained in finished units
3. Compute total WIP
4. Identify the DM, DL and OH components contained in WIP
5. Compute the costs necessary to complete WIP during the next period
6. Identify the DM, DL and OH components necessary to complete WIP in the following periods

Compute Equivalent Units of Production by Department: EU of production:

		Materials			Labor			Overhead		
		Dept Breakdown			Dept Breakdown			Dept Breakdown		
Compute EU:	Dept	Units	∑%	EU	Units	∑%	EU	Units	∑%	EU
	A	20	50%	10	20	20%	4	20	20%	4
	B	20	70%	14	20	30%	6	20	40%	8
	E	20	80%	16	20	40%	8	20	60%	12
	D	20	90%	18	20	70%	14	20	80%	16
	FG	20	100%	20	20	100%	20	20	100%	20
		100		78	100		52	100		60
% Complete:			78%			52%			60%	

Solution:
1. Compute cost per finished unit
2. Identify the DM, DL and OH components contained in finished units

FG					Unit Cost		Units Complete	∑
DM	∑ Cost / EU	=	$78,000 / 78	=	$1,000	x	20	20,000
DL	∑ Cost / EU	=	$104,000 / 52	=	$2,000	x	20	40,000
OH	∑ Cost / EU	=	$30,000 / 60	=	$500	x	20	10,000
	Totals				$3,500			$70,000

3. Compute total WIP
4. Identify the DM, DL and OH components contained in WIP
5. Compute the costs necessary to complete WIP during the next period
6. Identify the DM, DL and OH components necessary to complete WIP in the following periods

WIP	Units WIP		EU WIP*		EU FG		Unit Cost	∑ Cost to Complete
DM	80	-	58	=	22	x	~~$1,000~~	$22,000
DL	80	-	32	=	48	x	$2,000	$96,000
OH	80	-	40	=	40	x	$500	$20,000
	Totals						$3,500	$138,000

EU - FG
DM 78 - 20 = 58
DL 52 - 20 = 32
OH 60 - 20 = 40

Proof:	Total/unit		Total Units	∑
Est Total Costs:	$3,500	x	100	$350,000
Less: Cost Incurred to date:				$212,000
Est Cost to Complete:				$138,000

B. Process Costing Through Departments: Shrinkage

1. Most processes are departmentalized and run through several departments prior to completion (an example would be assembly, finishing, painting, testing etc.)
2. Each department is a cost center
3. Losses such as shrinkage, breakage or evaporation are normal, so the number of units that exit a department will typically be less than the number entering and the remaining units must bear the full cost of production.
   a. Units lost are subtracted from total units to arrive at EU
   b. The department where losses are incurred must make the adjustment.

Example 2: Accounting for shrinkage, loss or evaporation

Department	Units Started	Units Lost	Units Finished	Total Cost
A	11,000	1,000	10,000	$20,000
B	10,000	2,000	8,000	40,000
Total				$60,000

Department A transfers 10,000 units to Dept. B @ $2/ea for a total of $20,000. Dept. B looses an additional 2,000 units and makes the following adjustment:

	Units	Units Lost	Total Cost
Units Received	10,000	$2.00	$20,000
Units Lost	(2,000)	0.50	
Adjusted Amounts	8,000	$2,50	20,000
Dept. B Cost	8,000	$5.00	40,000
Finished Goods	8,000	$7.50	$60.000

C. Process Costing Through Departments: Cost of Production Schedule

1. The standard process cost report is called a *cost of production schedule* and contains seven components:
   a. Quantity Schedule
   b. Cost from Preceding Department
   c. Beginning WIP
   d. Current Production Costs
   e. Cost Transferred to Next Department
   f. Ending WIP
   g. Percentage of Completion for Beginning and Ending WIP

Example 3: Cost of Production Schedule

Cost of Production Schedule

Period 1

a	Qty Sched	Department A Units	Department A Units	Department B Units	Department B Units	Department C Units	Department C Units
	BOY WIP		0		0		0
	Units Started		11,000				
	Units In				8,000		6,000
	Units Lost	1,000		1,000		1,000	
	Units Out	8,000		6,000		4,000	
	EOY WIP	2,000		1,000		1,000	
	Total	11,000	11,000	8,000	8,000	6,000	6,000

Period 1

Cost Incurred

	Dept A	Dept B	Dept C
DM	$49,500	$34,000	$20,000
DL	$25,800	$44,800	$27,000
OH	$16,800	$39,000	$18,000
	$92,100	$117,800	$65,000

Period 1 % Completion BOY and EOY

g	% Complete WIP	Dept A	Dept B	Dept C
	BOY WIP			
	DM	-	-	-
	DL	-	-	-
	OH	-	-	-
	EOY WIP:			
	DM	50%	80%	100%
	DL	30%	40%	50%
	OH	20%	50%	50%

Period 2

a

Qty Sched	Department A		Department B		Department C	
	Units	Units	Units	Units	Units	Units
BOY WIP		2,000		1,000		1,000
Units Started		15,000				
Units In				14,000		12,000
Units Lost	1,000		1,000		1,000	
Units Out	14,000		12,000		10,000	
EOY WIP	2,000		2,000		2,000	
Total	17,000	17,000	15,000	15,000	13,000	13,000

Period 2

Cost Incurred

	Dept A	Dept B	Dept C
DM	$76,680	$60,480	$48,840
DL	$49,700	$94,500	$61,800
OH	$29,820	$71,250	$42,800
	$156,200	$226,230	$153,440

Period 2 % Completion BOY and EOY

g

% Complete WIP	Dept A	Dept B	Dept C
BOY WIP			
DM	50%	80%	100%
DL	30%	40%	50%
OH	20%	50%	50%
EOY WIP:			
DM	60%	70%	100%
DL	40%	50%	40%
OH	30%	50%	60%

Required: Complete the following Schedule for Periods 1 and 2

1. Compute the EU of Production for Periods 1 and 2
2. Complete the following Cost of Production Schedules for Periods 1 and 2

Suggestion: Make a copy of the schedules

Period 1

		Department A			Department B			Department C		
b	In Prev Dept	EU	Unit Cost	Total Cost	EU	Unit Cost	Total Cost	EU	Unit Cost	Total Cost
	Cost In									
	Adj for Losses									
	Adj Cost/Prev									
c	BOY WIP									
	Add this Period									
	DM									
	DL									
	OH									
	Sub-Total									
d	Current Cost									
	DM			49,500			34,000			20,000
	DL			25,800			44,800			27,000
	OH			16,800			39,000			18,000
	Sub-Total			92,100			117,800			65,000
	Total Cost									
e	Cost Out									
	BOY WIP									
	Start & Finish									
	Transferred Cost									
f	EOY WIP									
	From Prev. Dept									
	Current Dept:									
	DM									
	DL									
	OH									
	∑ WIP Cost EOY									
	Total									

Period 2

		Department A			Department B			Department C		
b	In Prev Dept	EU	Unit Cost	Total Cost	EU	Unit Cost	Total Cost	EU	Unit Cost	Total Cost
	Cost In									
	Adj for Losses									
	Adj Cost/Prev									
c	BOY WIP									
	Add this Period									
	DM									
	DL									
	OH									
	Sub-Total									
d	Current Cost									
	DM			76,680			60,480			48,840
	DL			49,700			94,500			61,800
	OH			29,820			71,250			42,800
	Sub-Total			156,200			226,230			153,440
	Total Cost									

e	Cost Out			
	BOY WIP			
	Start & Finish			
	Transferred Cost			
f	EOY WIP			
	From Prev. Dept			
	Current Dept:			
	DM			
	DL			
	OH			
	∑ WIP Cost EOY			
	Total			

Solution:

1. Compute the EU of Production for Periods 1 and 21.

EU of Production Period 1

	Department A				Department B				Department C			
	%	In Process	Trans	Total	%	In Process	Trans	Total	%	In Process	Trans	Total
DM	50%	1,000	8,000	9,000	80%	800	6,000	6,800	100%	1,000	4,000	5,000
DL	30%	600	8,000	8,600	40%	400	6,000	6,400	50%	500	4,000	4,500
OH	20%	400	8,000	8,400	50%	500	6,000	6,500	50%	500	4,000	4,500

Periodsss 2 EU of Production Schedule

	Department A					Department B					Department C				
		EOY	BOY				EOY	BOY				EOY	BOY		
	%	WIP	WIP	Trans	Total	%	WIP	WIP	Trans	Total	%	WIP	WIP	Trans	Total
DM	60	1,200	(1,000)	14,000	14,200	70	1,400	(800)	12,000	12,600	70	2,000	(1,000)	10,000	11,000
DL	40	800	(600)	14,000	14,200	50	1,000	(400)	12,000	12,600	40	800	(500)	10,000	10,300
OH	30	600	(400)	14,000	14,200	50	1,000	(500)	12,000	12,500	60	1,200	(500)	10,000	10,700

2. Complete the following Cost of Production Schedules for Periods 1 and 2

Period 1 Computations

		Department A			Department B			Department C		
b	In Prev Dept	EU	Unit Cost	Total Cost	EU	Unit Cost	Total Cost	EU	Unit Cost	Total Cost
	Cost In				8,000	$10.50	$84,000	6,000	$30.00	$180,000
	Adj for Losses				1,000	$1.50		1,000	$6.00	
	Adj Cost/Prev				7,000	$12.00	$84,000	5,000	$36.00	$180,000
c	BOY WIP									
	DM									
	DL									
	OH									
	Sub-Total									
d	Current Cost									
	DM	9,000	$5.50	$49,500	6,800	$5.00	$34,000	5,000	$4.00	$20,000
	DL	8,600	$3.00	$25,800	6,400	$7.00	$44,800	4,500	$6.00	$27,000
	OH	8,400	$2.00	$16,800	6,500	$6.00	$39,000	4,500	$4.00	$18,000
	Sub-Total		$10.50	$92,100		$18.00	$117,800		$14.00	$65,000
	Total Costs		$10.50	$92,100		$30.00	$201,800		$50.00	$245,000
e	Cost Out	8,000	$10.50	$84,000	6,000	$30.00	$180,000	4,000	$50.00	$200,000
f	EOY WIP									
	From Prev. Dept									
	Current Dept:									
	DM	1,000	$5.50	$5,500	800	$5.00	$4,000	1,000	$4.00	$4,000
	DL	600	$3.00	$1,800	400	$7.00	$2,800	500	$6.00	$3,000
	OH	400	$2.00	$800	500	$6.00	$3,000	500	$4.00	$2,000
	Total WIP			$8,100			$9,800			$9,000
	Total			$92,100			$201,800			$245,000

Period 2 Computations

		Department A			Department B			Department C		
b	In Prev Dept	EU	Unit Cost	Total Cost	EU	Unit Cost	Total Cost	EU	Unit Cost	Total Cost
	Cost In				14,000	$10.98	$153,760	12,000	$29.85	$358,215
	Adj for Losses				1,000	$0.84		1,000	$2.71	
	Adj Cost/Prev				13,000	$11.83	$153,760	11,000	$32.56	$358,215
c	BOY WIP				1,000	$12.00	$12,000	1,000	$36.00	$36,000
	Add this Period									
	DM	1,000	$5.50	$5,500	800	$5.00	$4,000	1,000	$4.00	$4,000
	DL	600	$3.00	$1,800	400	$7.00	$2,800	500	$6.00	$3,000
	OH	400	$2.00	$800	500	$6.00	$3,000	500	$4.00	$2,000
	Sub-Total			$8,100			$9,800			$9,000
d	Current Cost									
	DM	14,200	$5.40	$76,680	12,600	$4.80	$60,480	11,000	$4.44	$48,840
	DL	14,200	$3.50	$49,700	12,600	$7.50	$94,500	10,300	$6.00	$61,800
	OH	14,200	$2.10	$29,820	12,500	$5.70	$71,250	10,700	$4.00	$42,800
	Sub-Total		$11.00	$156,200		$18.00	$226,230		$14.44	$153,440
	Total Costs		$11.00	$164,300		$29.83	$401,790		$47.00	$556,655
e	Cost Out									
	BOY WIP	2,000	$10.88	$21,760	1,000	$30.11	$30,110	1,000		$50,000
	Start & Finish	12,000	$11.00	$132,000	11,000	$29.83	$328,105	9,000	$47.00	$423,045
	Transferred Cost	14,000	$10.98	$153,760	12,000	$29.85	$358,215	10,000		$473,045
f	EOY WIP									
	From Prev. Dept				2,000	$11.83	$23,655	2,000	$32.56	$65,130
	Current Dept:									
	DM	1,200	$5.40	$6,480	1,400	$4.80	$6,720	2,000	$4.44	$8,880
	DL	800	$3.50	$2,800	1,000	$7.50	$7,500	800	$6.00	$4,800
	OH	600	$2.10	$1,260	1,000	$5.70	$5,700	1,200	$4.00	$4,800
	∑ WIP Cost EOY			$10,540			$43,575			$83,610
	Total			$164,300			$401,790			$556,655

Supporting Computations:

Computation of EU:

EU = Units Fin or Trans - (BOY% Complete x BOY units) + (EOY% Complete x EOY Units)
P1 DM = 8,000 – 0 + (.5 x 2,000) = 9,000

Period 2 Computations: (Period 1 computations are the same except for data that is not relevant such as transferred in/out data)
Dept A, schedule d:
Unit Costs: Total Cost (given)/EU
Dept A, schedule e:
EU is from EU computation schedule
Total cost is from schedule d (see blue highlighted numbers)
Dept A, schedule f:
EU in EOY WIP: EU under current costs – units transferred
9,000 – 8,000 = 1,000
Dept B, schedule b:
Unit Cost: EU transferred (see given data)
Unit Cost: Transferred Cost from Dept A, schedule e/EU transferred in
Cost Adjustment: Total Cost Transferred from previous dept/adjusted EU
Dept B, schedule c:
EU: WIP at BOY
From Period 1, Dept B, schedule b (prior period); ($10.50 + $1.50)