Problem Set #4
15.501/516: Financial and Managerial Accounting
Solutions

1. a. At the end of year 4, ending inventory under LIFO is $3+$4+$5+$6 = $18, while the ending inventor under FIFO is $6*4 = $24. Thus the LIFO Reserve after year 4 is $6.
   b. If the firm had manufactured 4 items, the LIFO COGS would be 4 * $10 = $40.
   With the liquidation, LIFO COGS is $10 + 6 + 5 + 4 = $25.
   Therefore, the effect is the liquidation is to reduce reported COGS by $15.
   b. There is now one unit in inventory with a historical cost of $3. Current cost is $10. Therefore, the LIFO Reserve is $7.
   c. Because the cost of manufacturing this product jumped so dramatically in year 4. Without the liquidation, the LIFO reserve would have increased to $40 - (6 + 5 + 4 + 3) = $22. That equals the sum of the liquidation effect ($15) plus the actual ending LIFO Reserve ($7).
   d. FIFO COGS in Yr 5 would be: $6*4= $24. This is lower than the LIFO COGS that resulted even with the liquidation, since the latter includes one unit of cost at $10. However, given the large jump in Yr 5 production costs, FIFO COGS is substantially lower than LIFO COGS would have been in the absence of a liquidation. (Note: there is no such thing as a FIFO liquidation, because the earliest costs are always moved to COGS first -- regardless of the amount of current production.

      Th change in LIFO reserve in year 5 is $7 - $6 = $1, which explains the difference in COGS between LIFO and FIFO of $25 -$24 = $1. However, the $1 change in LIFO Reserve understates the total effect of using LIFO relative to FIFO on COGS due to liquidation in year 5.

   e. Since LIFO COGS is lower by $15 due to the liquidation, pre-tax income is higher by that amount. Hence, the firm pays .4 * $15 or $6 more in taxes.

1. a. Net income, which is an after-tax number, increased by $20.8 million. Since the tax rate is assumed to be 34%, the "older costs" must have been lower by $20.8 / (1 - .34) = $31.52 million.
   b. If the older costs were $31.52 million lower, then pre-tax income was $31.52 MM higher, so additional taxes were .34 * $31.52 = $10.72 MM.
   c. The difference between COGS under FIFO versus LIFO equals the change in the LIFO Reserve over the time period in question. During the current year, the reserve increased from ($1,941 - 872) to (1,885 - 760.9) or by $55.1 MM. The current year tax savings from LIFO is .34 * $55.1 = $18.73.
   d. The LIFO Reserve represents the cumulative difference in COGS between LIFO and FIFO over the life of the firm. Hence, the tax savings from LIFO can be estimated as (1,885 - 760.9) * 0.34 = $382.2 MM.

2. a. See the attached exhibit for all the numbers.
   Starting with 1998, note that several items can be determined without referring to the problem set up, just by knowing relationships like A = L + SE.

   - Since Total Assets = $174,375, we know that Total Liab. And Shrholders' Equity = $174,375.
   - Total Liabilities equals the sum of the three listed components, or $48,748.
   - That leaves Retained Earnings on the L + SE side of the balance sheet, so RE = $627.

- Since 1998 is the first year of operations, and no dividends have been declared, Net Income (after taxes) must also equal $627.
- Since the tax rate is 40%, Net income before taxes = $627 / (1 - .4) = $1,045
- Tax expense = 1,045 * .4 = $418.
- COGS can be determined by applying the FIFO cost flow assumption to the product costs and quantities given in the problem: (516 * $320) + (284 * $475) = $300,020.
- Similarly, ending inventory can be determined using FIFO: (184 * $320) + (116 * 475) = $113,980.
- That leaves only Cash on the A(sset) side of the Balance Sheet, so Cash = $174,375 – 4,300 – 113,980 – 41,272 = 14,823.
- Since all other I/S lines have now been determined, Warranty expense = 501684 – 300,020 – 151,600 – 34,400 – 4,275 – 1,045 = $10,344.
- Since warranty expense is 2% of gross sales, the latter must be 10,344 / .02 = 517,200. The I/S reports revenues net of bad debt expense. Hence, BDE = 517,200 – 501,684 = 15,516. This number represents 5% of credit sales, which are 60% of total sales, i.e., 15,516 = .05 * (.6 * 517,200)

Moving to 1999:

- COGS, using FIFO = (184 * 320) + [(1,126 – 184) * 335] + (116 * 475) + [(739 – 116) * 495] = $737,935
- Ending Inventory, using FIFO, = (258 * 335) + (227 * 495) = 198,795.
- Since rent is paid for the next month, Prepaid Rent = $4,500.
- Gross sales revenue = 1,196,980 + 37,020 = 1,234,000. Warranty expense is 2% of gross sales or $24,680.
- Net income before tax can then be computed as net revenue – all pre-tax expenses = $91,710
- Tax expense = .4 * 91,710 = $36,684
- Net income after tax = 91,710 – 36,684 = $55,026.
- Since taxes won't be paid until the next year, Taxes Payable (L) = $36,684.
- Accrued Warranty Liability = 4,710 + 24,680 – 18,525 = 10,865.
- Total Assets must equal L + SE = $296,762.
- Since all other others have been determined, Cash must equal $7,772.
- The Allowance for Uncollectible Accounts = 5,276 + 37,020 – 10,240 = $26,780.

b. SCF: Indirect method

Net Income	$ 55,026
- Δ A/R	(44,423)
-Δ Inventory	(84,815)
-Δ Prepaid Rent	(200)
+Δ A/P	24,940
+ΔTaxes Payable	36,266
+Δ Accr. Warr. Liability	6,155
Cash From Operations	$ (7,051)

CFO < NI mainly because of the large build-up of inventory and the amount of credit sales that have not yet been collected. Bigelow has to pay its suppliers faster than it is collecting form its customers (note the rather small increase in A/P relative to A/R).

c. 1999 COGS and Ending Inventory would differ under LIFO from the numbers reported using FIFO. The change in COGS would also cause differences in NI before taxes, tax expense (and hence, taxes payable) and NI after tax (and hence, retained earnings). Cash would not be affected because 1999 have not been paid as of the end of the reporting period.

COGS LIFO = (1,126 * $335) + (739 * $495) = $743,015
End. Inv'y. LIFO = 1998 balance + (74 * $335) + (111 * $495) = $193,795
NI before taxes = 91,710 - (743,015 - 737,935) = 86,630
Tax Expense = 86,630 * .4 = 34,652
NI after tax = 51,978
Retained earnings = 627 + 51,978 = 52,605

e. The company has only $7,772 of cash on hand, but a tax payment of $36,684 is due in one month, along with the next rental payment of $4,500 in 20 days -- not mention other ongoing expenses like salaries. The company needs to increase its A/R turnover, collecting from customers more quickly, but may also need a cash infusion in the form of a bank loan or additional contributed capital.