ACCT 101: PP&E and Intangibles

Session 6

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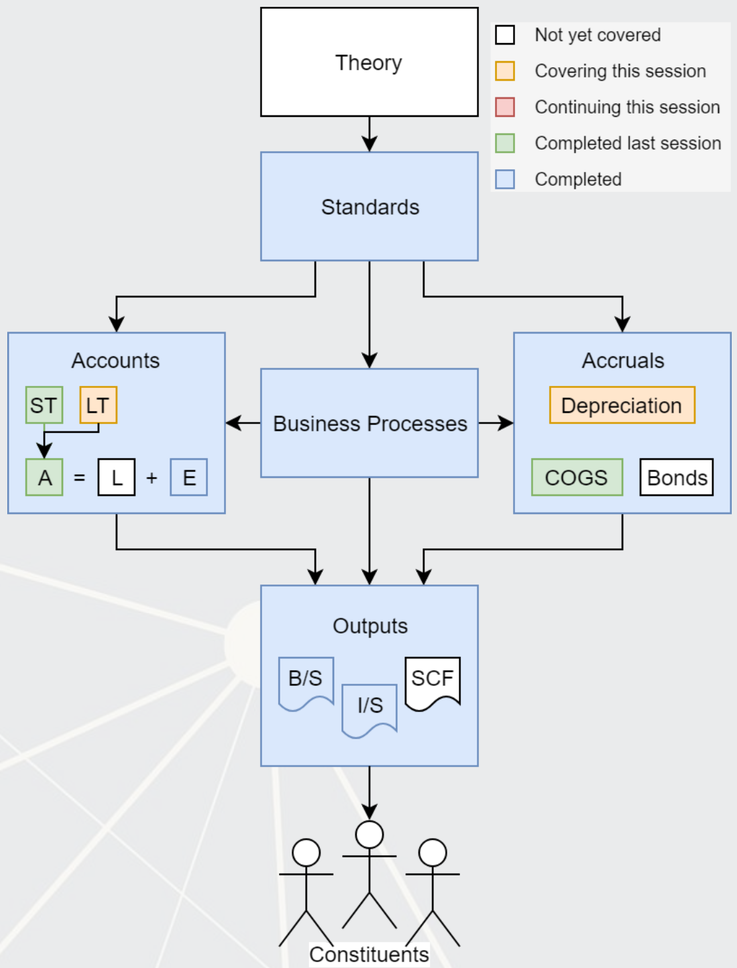
Front matter

Learning objectives



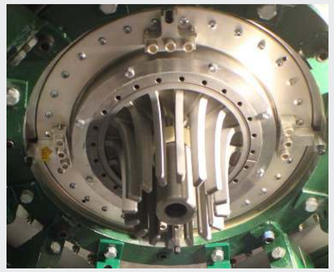
PP&E, Intangibles (Chapter 7)

1. Understand which assets qualify as PP&E and Intangibles
2. Account for acquisition and depreciation of PP&E
3. Understand additional issues related to PP&E
4. Account for intangibles

What are Non-current Assets?

Non-Current Assets

- Long term investments
- Construction in Progress
  - Incomplete skyscrapers
  - Incomplete manufacturing plants
  - Incomplete complicated machinery
    - Tungsten cathode, LPP Fusion, 1.25 years

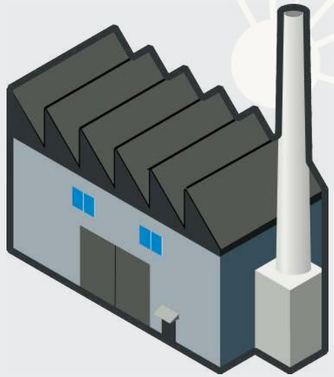


Non-Current Assets

- *Property, Plant, and Equipment*, PP&E
  - Leasehold Land
    - 99 year ownership
    - Central Boulevard white site
      - S$2.57B
  - Freehold land
    - Permanent ownership
    - The Peak @ Cairnhill II
  - Natural Resources
    - San Ardo Oil Field

Non-Current Assets

- *Property, Plant, and Equipment*, PP&E
  - Buildings
  - Land improvements
  - Furniture and Fixtures
  - Equipment
  - Machinery
  - Vehicles



Non-Current Assets

- *Intangibles*
  - Patents
  - Internally developed software
  - Trademarks and names
  - M&A value (goodwill)
- Not accounted for intangibles
  - Reputation
  - Own brand name
  - Management quality

IPOS
INTELLECTUAL PROPERTY
OFFICE OF SINGAPORE

What will we need to do?

Asset	Related expense account
Land (freehold)	None
Land (leasehold)	Depreciation
Buildings	Depreciation
Furniture & fixtures	Depreciation
Machinery	Depreciation
Vehicles	Depreciation
Land improvements	Depreciation
Natural resources	Depletion
Intangibles (with finite useful lives)	Amortization
Intangibles (with indefinite useful lives)	None

PP&E Acquisition

What do we include?

> PP&E has useful life or extends useful life, whereas expenses do not extend useful life but merely maintain or restore working order. [IAS 16]

- Include as an asset:
  - Anything with useful life
  - Anything *extending* useful life
- Expense:
  - Maintenance
    - Maintenance doesn’t extend useful life, it just keeps useful life where it should be

Purchasing (IAS 16)

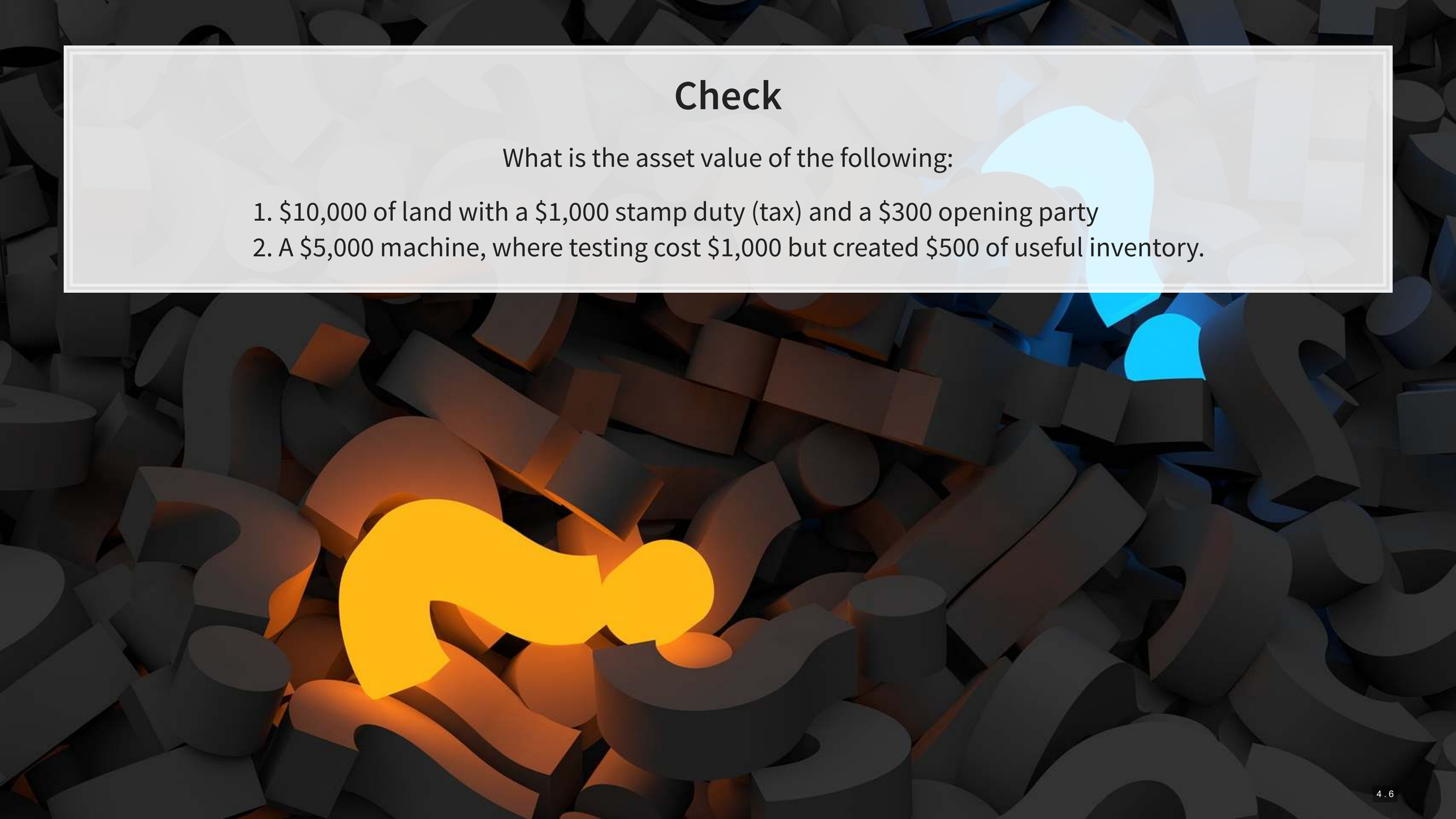
- Include:
  - Purchase price at historical cost
    - Net of discounts
  - Duties and *non-refundable* taxes
  - Employee benefits
    - For setting up the PP&E, such as insurance
    - Purchase commissions
  - Site preparation
  - Delivery and handling
  - Installation and/or assembly
  - Testing expenses
    - Net of test good proceeds
  - Fees incurred

Purchasing (IAS 16)

- What don’t we include?
  - Opening ceremonies
    - No useful life after
  - Advertising a new product
    - A direct expense for operations, not the PP&E
  - Business costs due to dealing with customers
    - Operating costs
  - Admin/overhead costs
    - Operating costs

Examples of PP&E Value

PP&E	Typical costs included in asset's value
Land	Purchase price, commission (to agents), taxes paid, fees (legal, surveying), grading (changing elevation), removing unwanted structures
Land improvements	Fencing, paving, lighting, security systems, landscaping
Buildings (constructed)	Architect's fees, contractors' fees, materials, labor and overhead, interest on funds borrowed for construction
Buildings (purchased)	Purchase price, commission (to agents), taxes paid, repair and renovation costs
Equipment	Purchase price, transport, insurance during transit, sales tax, installation, testing (net of useful products)



Check

What is the asset value of the following:

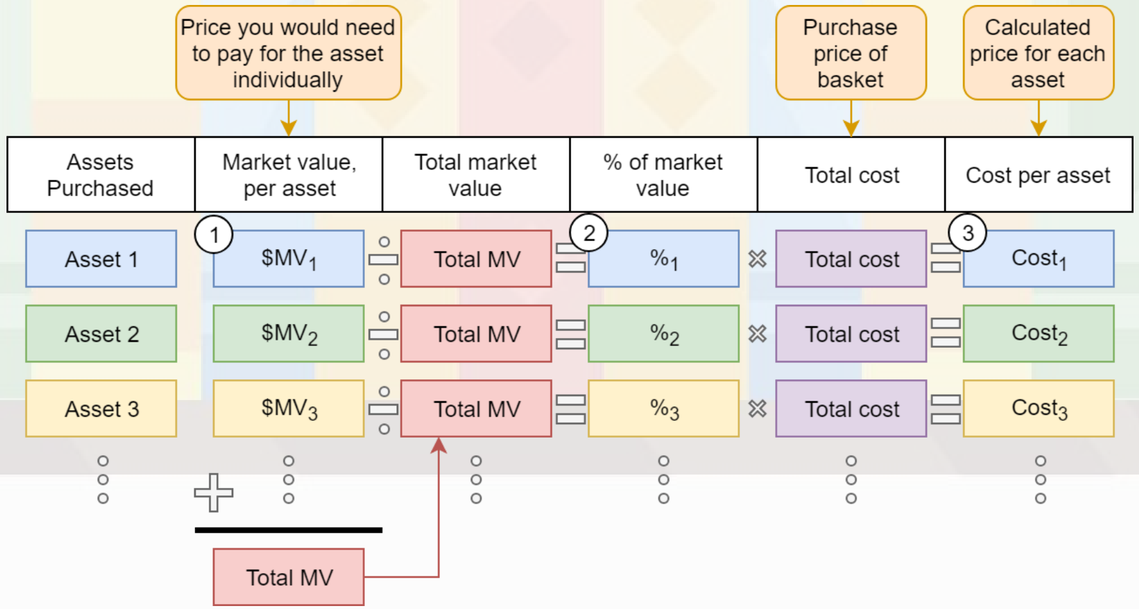
1. $10,000 of land with a $1,000 stamp duty (tax) and a $300 opening party
2. A $5,000 machine, where testing cost $1,000 but created $500 of useful inventory.

Solution

1. $10,000 of land with a $1,000 stamp duty (tax) and a $300 opening party
   - Answer: $11,000
   - Purchase cost is included
   - Taxes are including (unless refundable)
   - Opening ceremonies are excluded
2. A $5,000 machine, where testing cost $1,000 but created $500 of useful inventory.
   - $5,500
   - Purchase cost is included
   - Testing costs are included
   - Inventory created during testing is subtracted

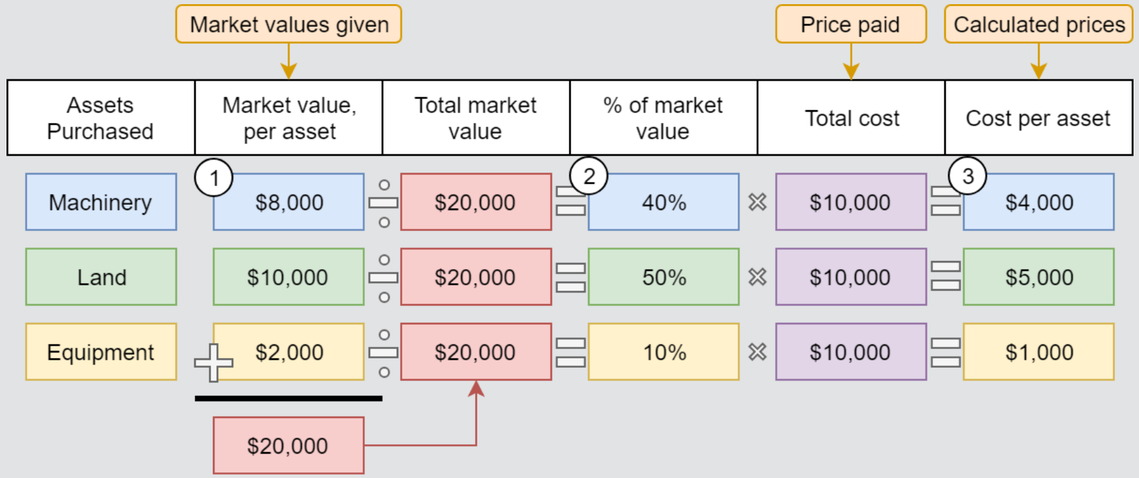
Basket purchasing

- Often, companies purchasing groups of assets
  - Firesales or deals with other companies
- We call this basket purchasing
  1. Determine the market value of each asset
  2. Allocate a percent of market value to each asset
  3. Allocate basket price by percentages to assets
- Record journal entries as usual



Basket purchasing example

Situation: Bought Machinery (MV: $8,000), Land (MV: $10,000), and Equipment (MV: $2,000) for $10,000 in one cash purchase

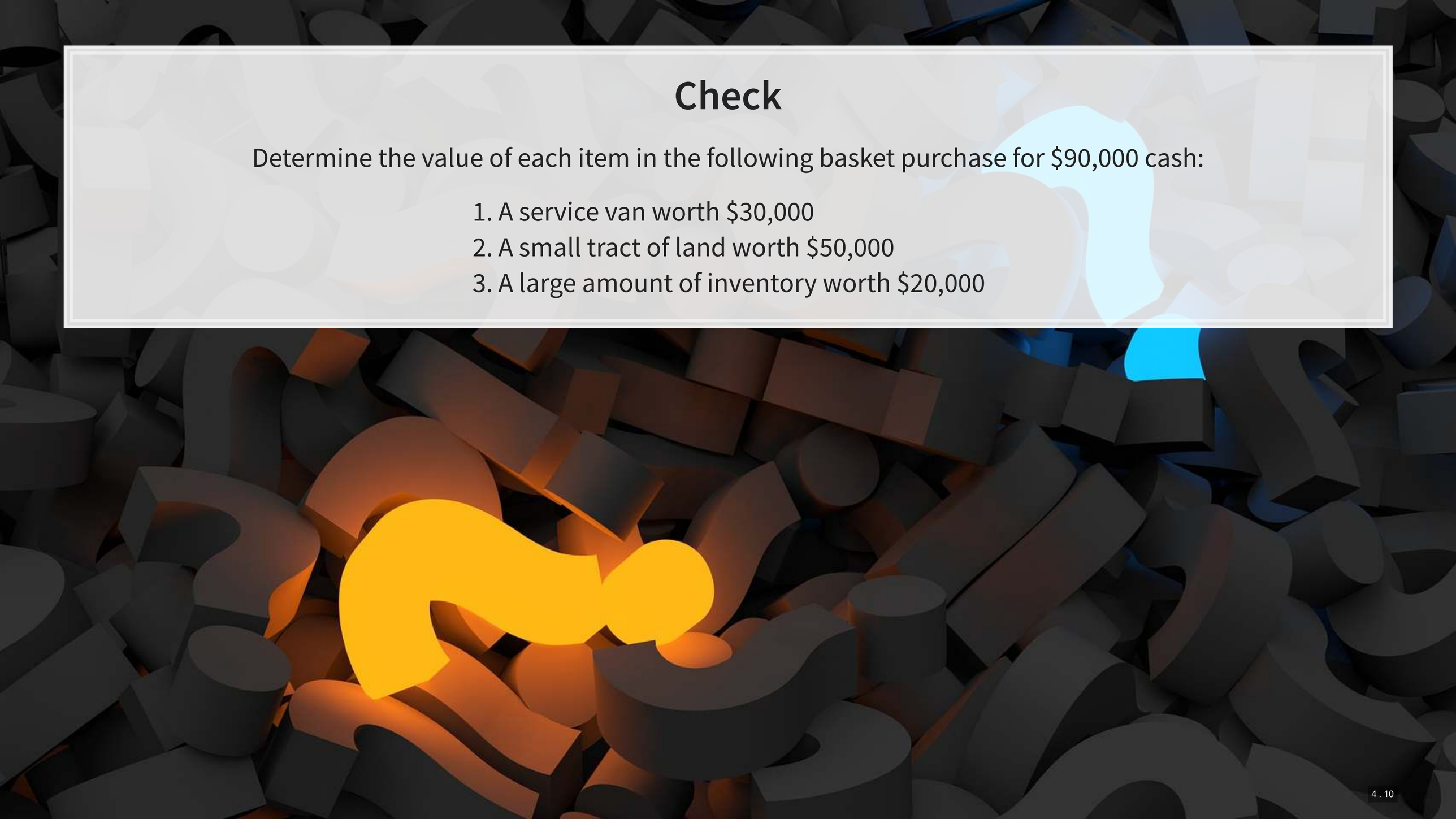


Date	Account	DR	CR
20YY.MM.DD	Machinery	4,000	
	Land	5,000	
	Equipment	1,000	
	Cash		10,000
Basket purchase			

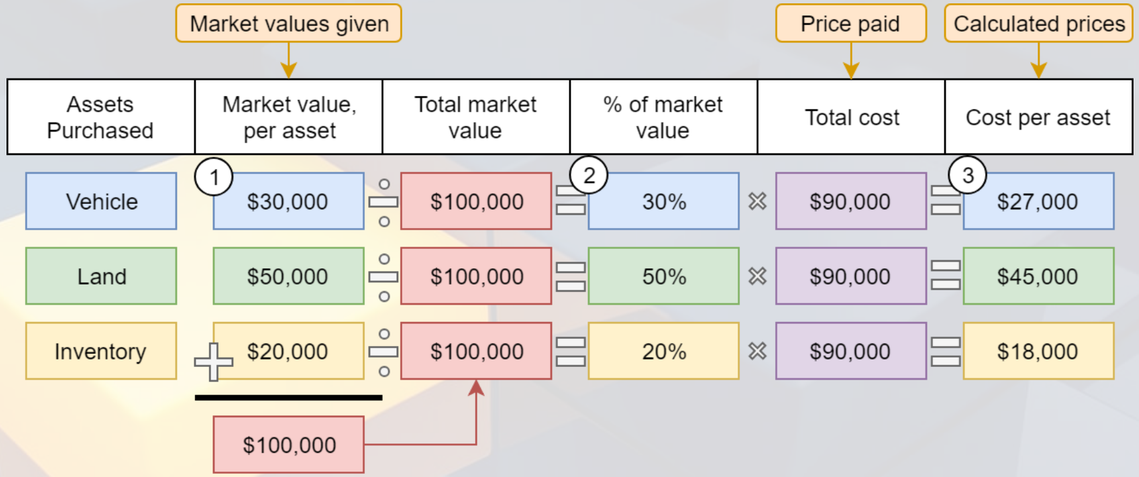
Check

Determine the value of each item in the following basket purchase for $90,000 cash:

1. A service van worth $30,000
2. A small tract of land worth $50,000
3. A large amount of inventory worth $20,000



Solution



Date	Account	DR	CR
20YY.MM.DD	Vehicle	27,000	
	Land	45,000	
	Inventory	18,000	
	Cash		90,000
Basket purchase			

Repairs

- Standard repairs are an expense
  - They don’t increase useful life
    - They maintain it
- Repairs that increase useful life should be capitalized
  - Add the repair cost to asset value

> Capitalize repairs *only* when useful life changes

Example: Maintenance maintaining useful life

Date	Account	DR	CR
20YY.MM.01	Maintenance expense	100	
	Cash		100
Paid $100 for maintenance of machinery			

Example: Maintenance maintaining increasing life

Date	Account	DR	CR
20YY.MM.01	Machinery	100	
	Cash		100
Paid $100 for maintenance to increase useful life of machinery			

Depreciation, Revisited

Why we depreciate

- Recognize usage of assets over time
  - Even though we still have the asset, it's lost value
    - Not as new
  - Charge to income statement as *depreciation expense*
  - Recognize on balance sheet as *accumulated depreciation*
    - Contra asset
- Matching principal
  - We used the asset to generate revenue, so we need to match asset usage (expense) to this revenue

Example: Depreciation journal entry sketch

Date	Account	DR	CR
20YY.MM.DD	Depreciation expense	XX	
	Accumulated depreciation -- [asset]		XX
Recognized depreciation of XX on [asset]			

Depreciation in every day life

How much does 1 year affect the value of the following?

1. Smart phone
2. Car
3. Textbook
4. Fiction book

Depreciation methods

1. Straight line
   - We've seen this one already!
   - $Depr = \frac{Cost - Salvage}{\#Periods}$
2. Units of activity
   - $Depr = (Cost - Salvage)\frac{Units\ Used}{Total\ Units}$
3. Double declining balance
   - $P = 2/\#Periods$
   - $Depr = (Book - Accum\ Depr) \cdot P$

> Note: *Never go below salvage value*. Stop depreciating when you hit salvage value

- *Salvage value* is also known as *residual value*

Picking a depreciation method

> The depreciation method used shall reflect the pattern in which the asset's future economic benefits are expected to be consumed by an entity. [FRS 16:60]

- Expect variation in methods used, as different firms may argue different usage patterns for the same assets

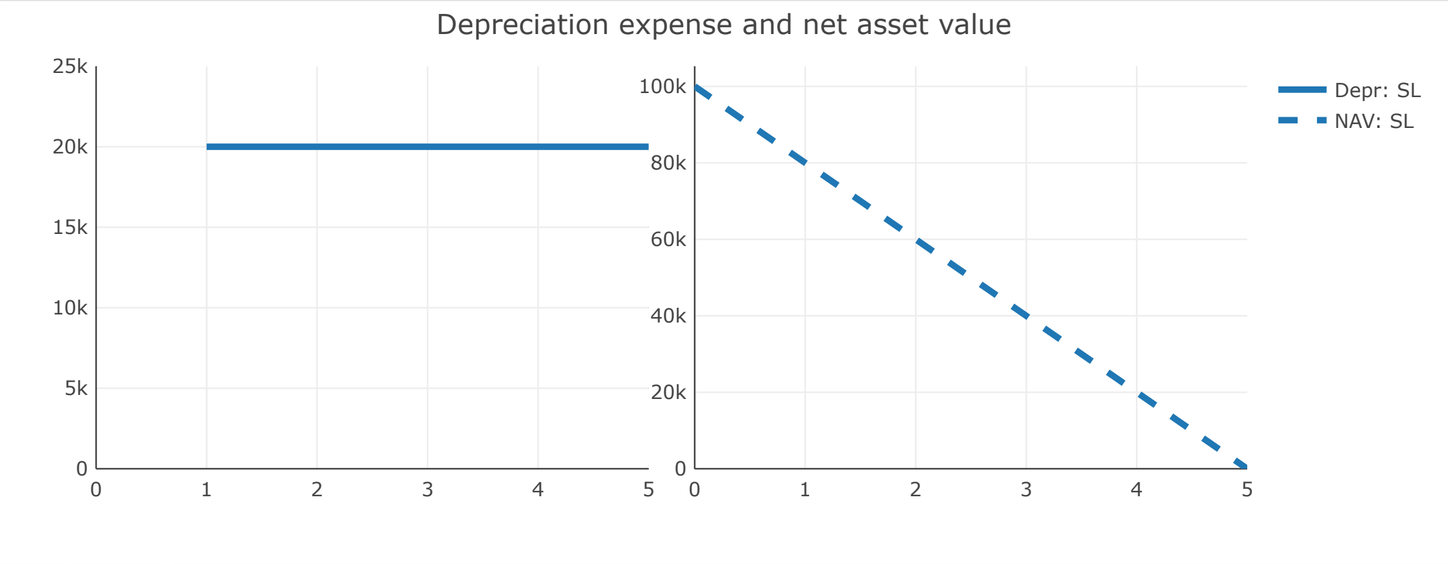
> The method must be used consistently from period to period. [FRS 16:61, 62]

  - You generally can't change methods during the life of an asset

Straight-line depreciation

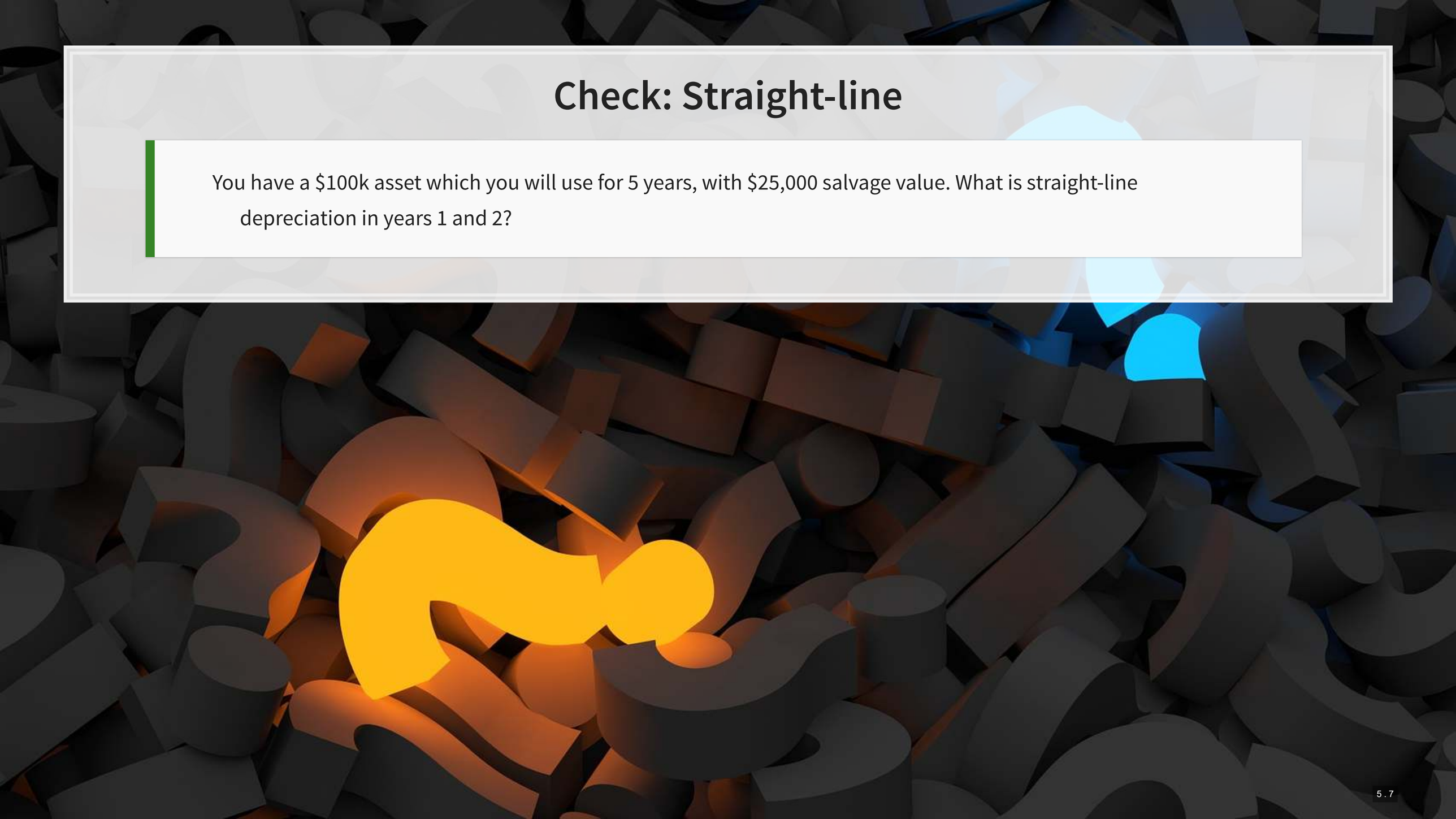
$$Depr = \frac{Cost - Salvage}{\#Periods}$$

- Constant over time
  - Same amount per year
- Partial years: multiply by the $Months\ used/12$
- Will end up at salvage value after $\#Periods$ periods



Check: Straight-line

You have a $100k asset which you will use for 5 years, with $25,000 salvage value. What is straight-line depreciation in years 1 and 2?



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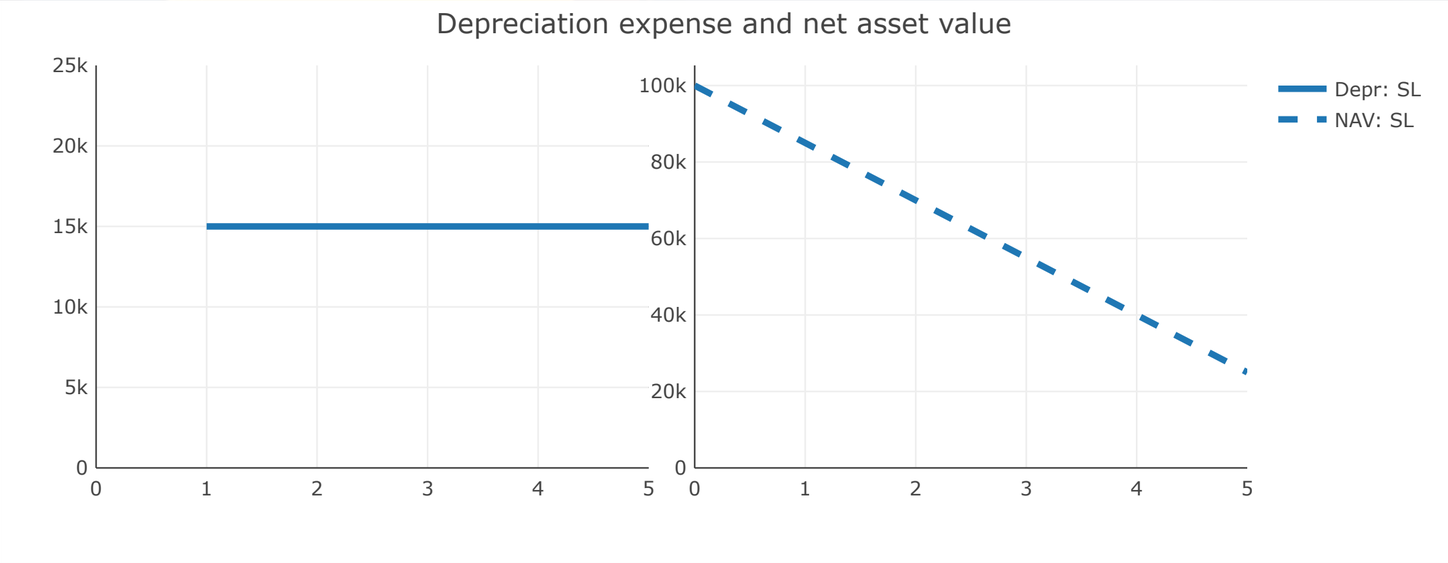
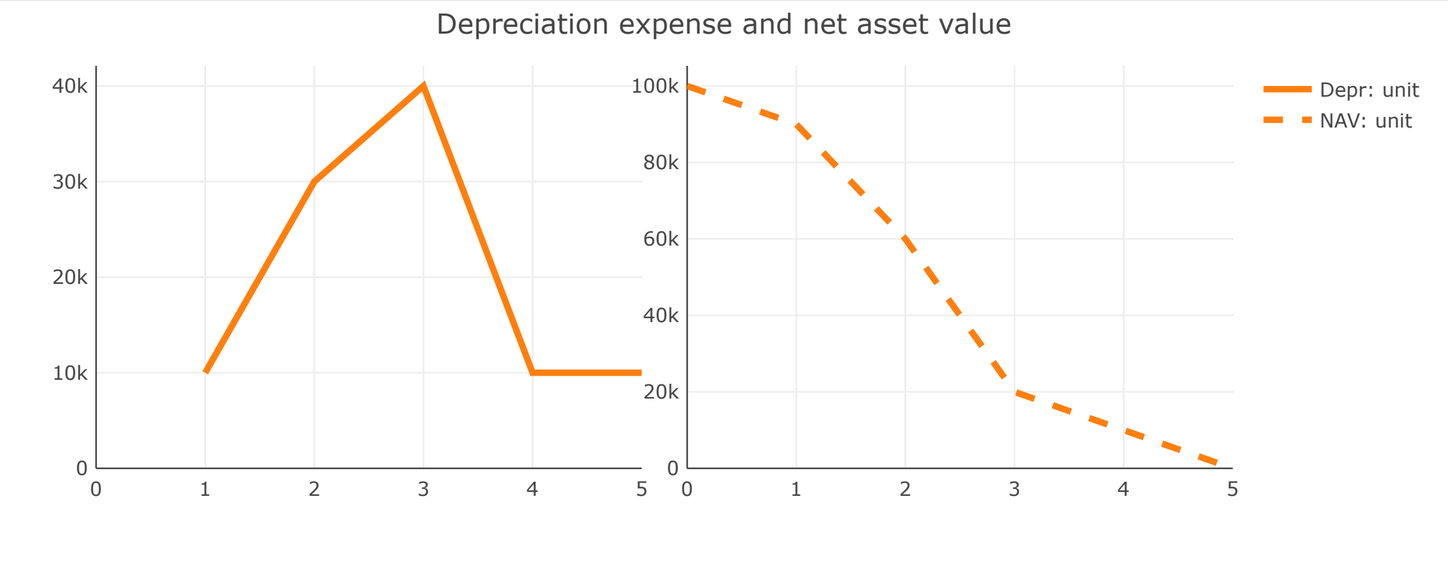


Units of production depreciation

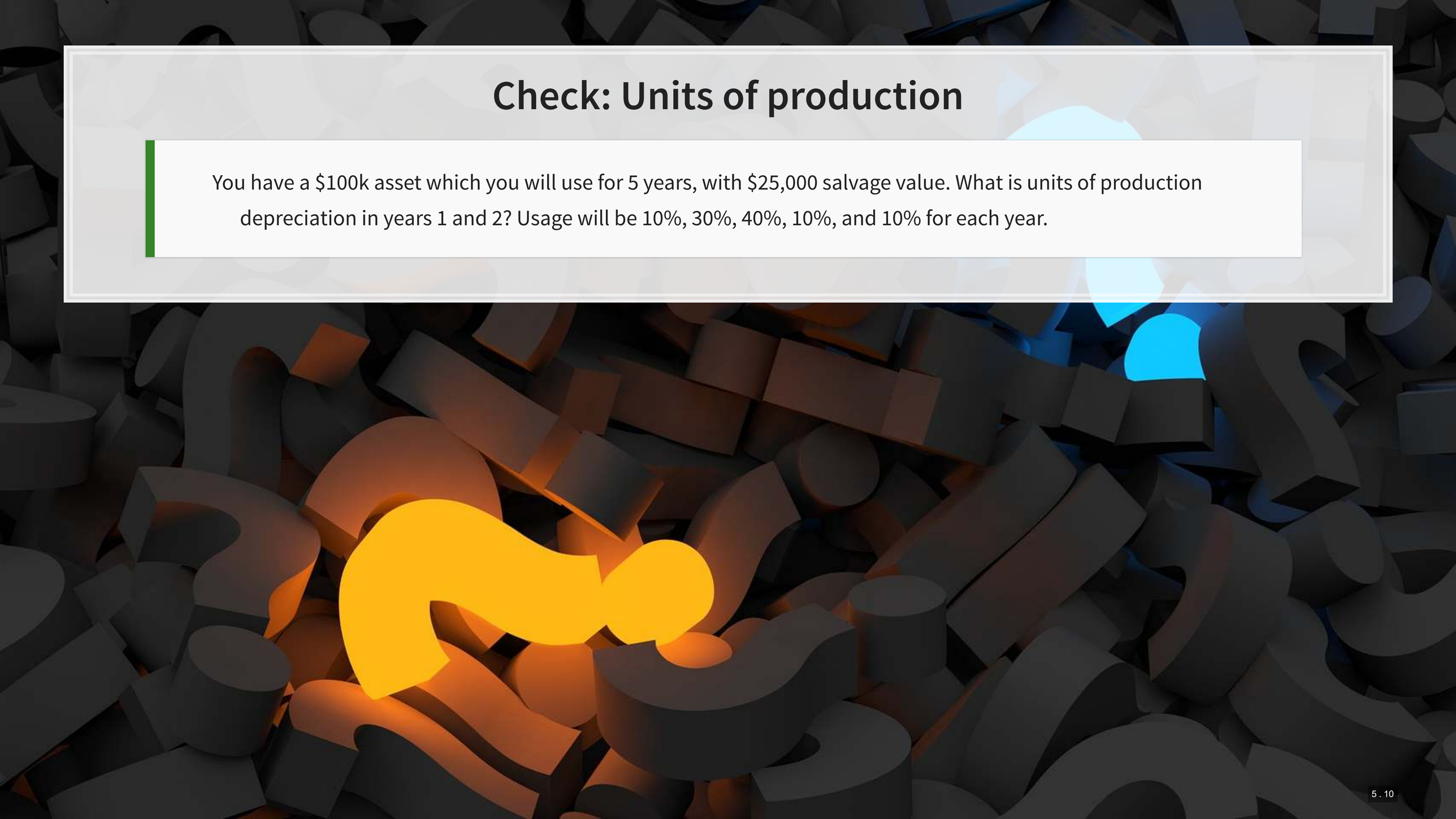
$$Depr = (Cost - Salvage)\frac{Units\ Used}{Total\ Units}$$

- Constant per unit produced
  - Same amount per unit, but units vary by year
- Partial years: no change
- Will end up at salvage value after the total number of units are produced



Check: Units of production

You have a $100k asset which you will use for 5 years, with $25,000 salvage value. What is units of production depreciation in years 1 and 2? Usage will be 10%, 30%, 40%, 10%, and 10% for each year.



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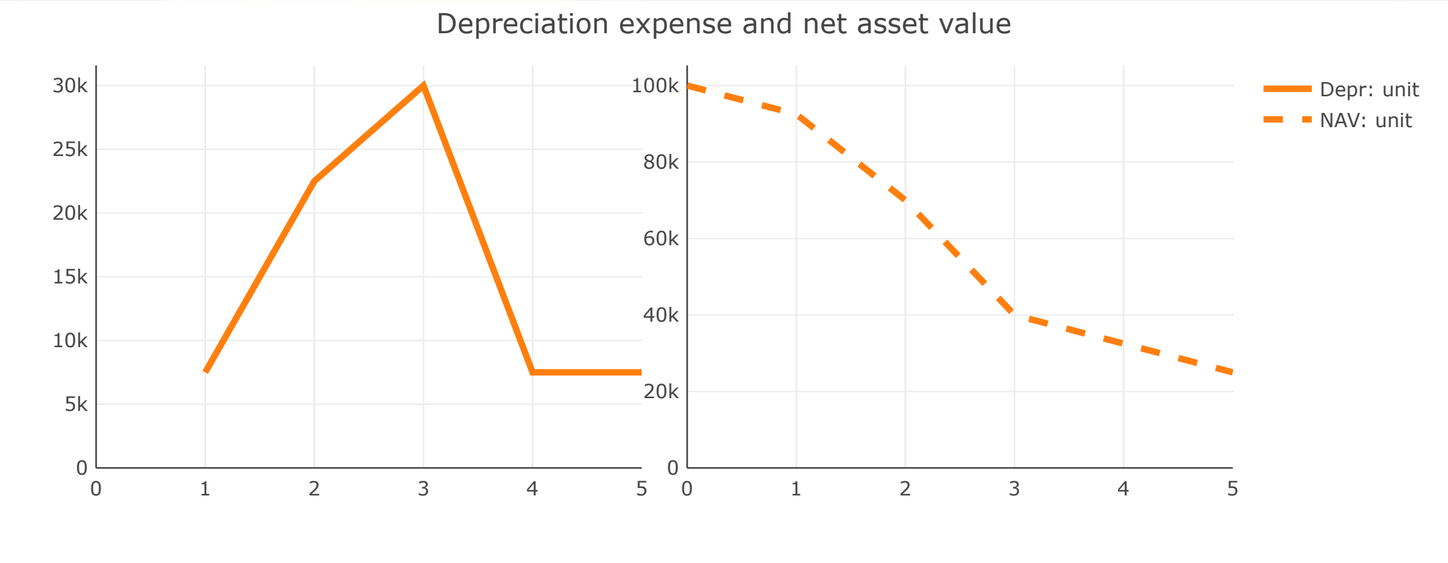
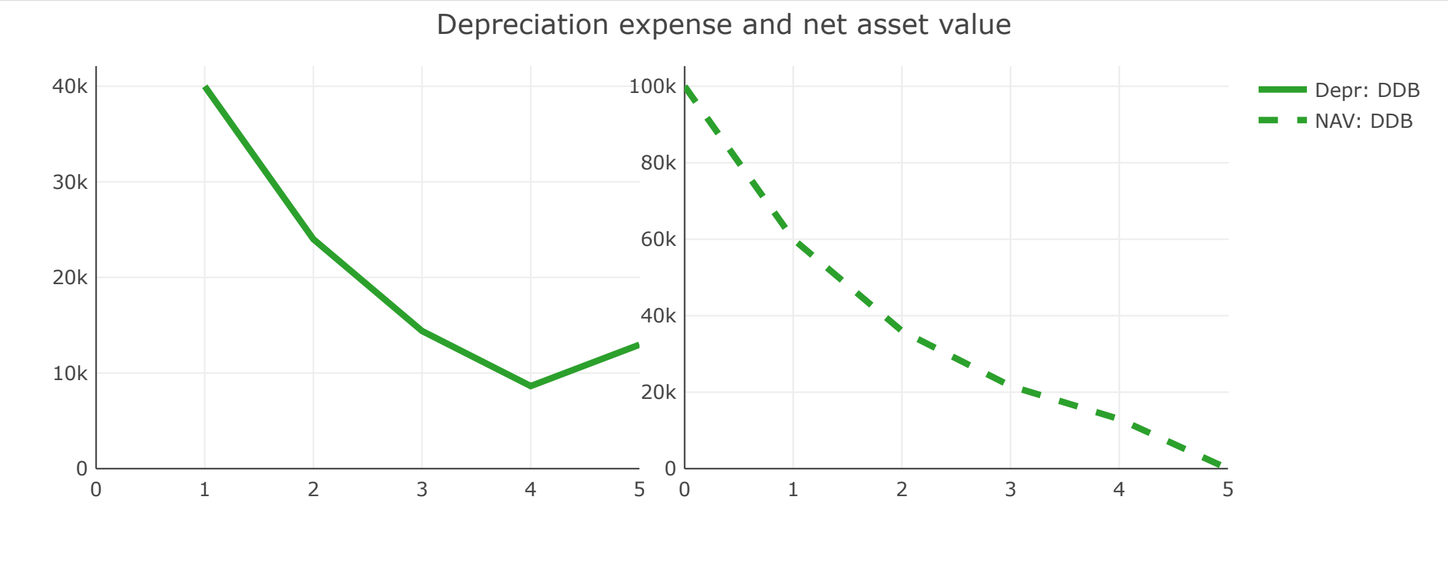


Double declining balance depreciation

$$Depr = (Cost - Acc\ Depr) \times P, P = \frac{2}{\#Periods}$$

- More depreciation early, less later
- Partial years: multiply by the $Months\ used/12$
- Can hit salvage value early – stop depreciating at this point



Double declining balance depreciation

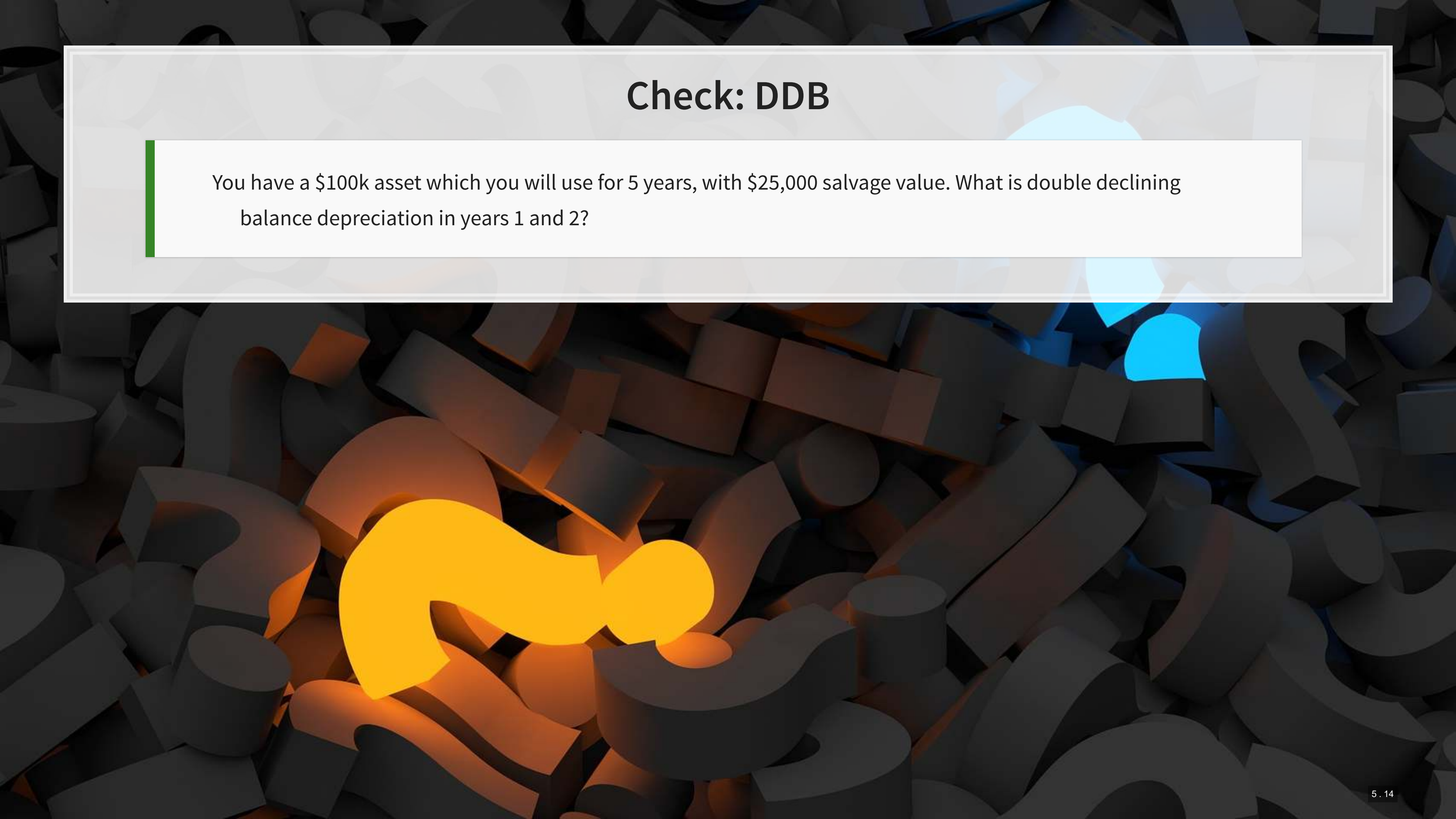
$$Depr = (Cost - Acc\ Depr) \times P, P = \frac{2}{\#Periods}$$

Steps for calculation:

1. Determine the percentage to deduct each period, $P = \frac{2}{\#Periods}$
2. Determine net asset value, $NAV = Historical\ Cost - Accum\ Depr$
3. Determine the maximum depreciation, $max = NAV \cdot P$
4. If not the last period:
   - Check if $NAV - max \geq salvage$
   - If it is, depreciation is max
   - If it is not, depreciation is $NAV - salvage$
5. If the last period:
   - Take $NAV - salvage$ as your depreciation

Check: DDB

You have a $100k asset which you will use for 5 years, with $25,000 salvage value. What is double declining balance depreciation in years 1 and 2?



Check: DDB

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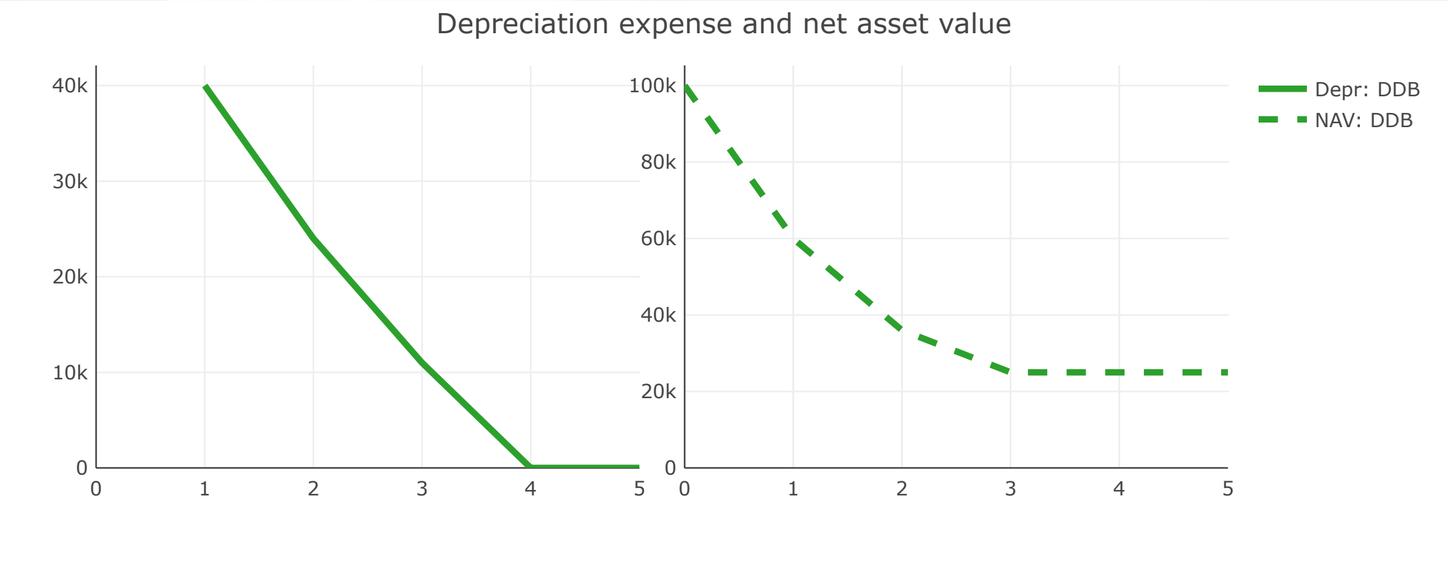
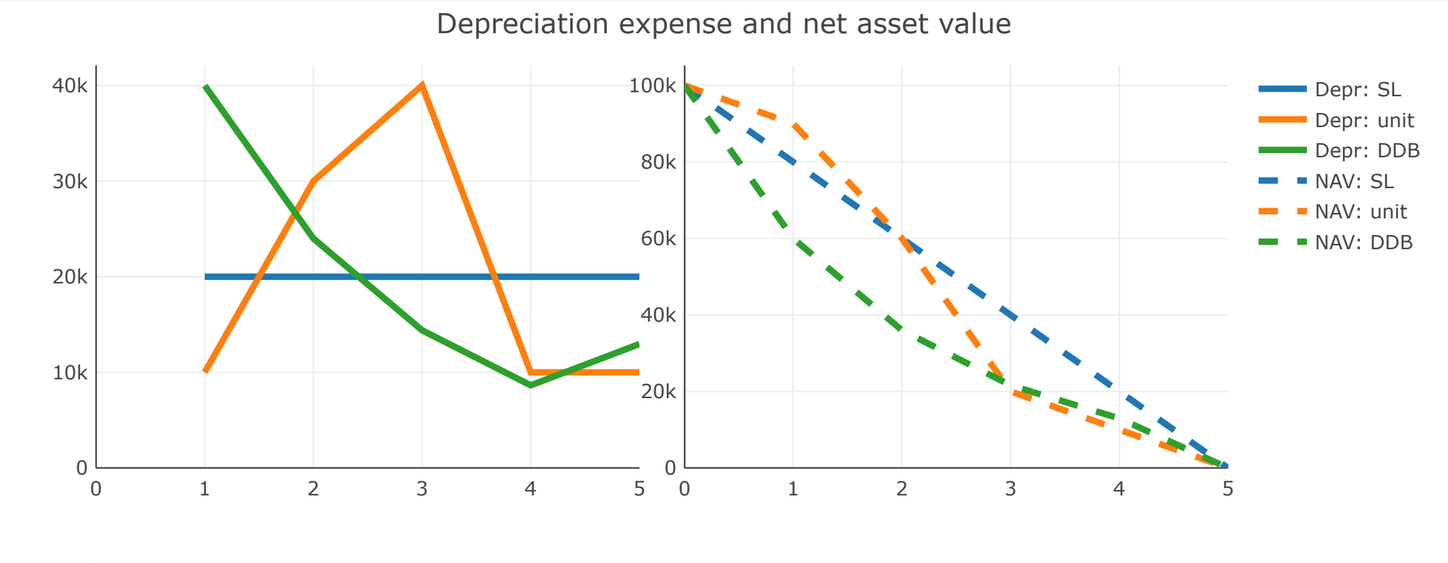


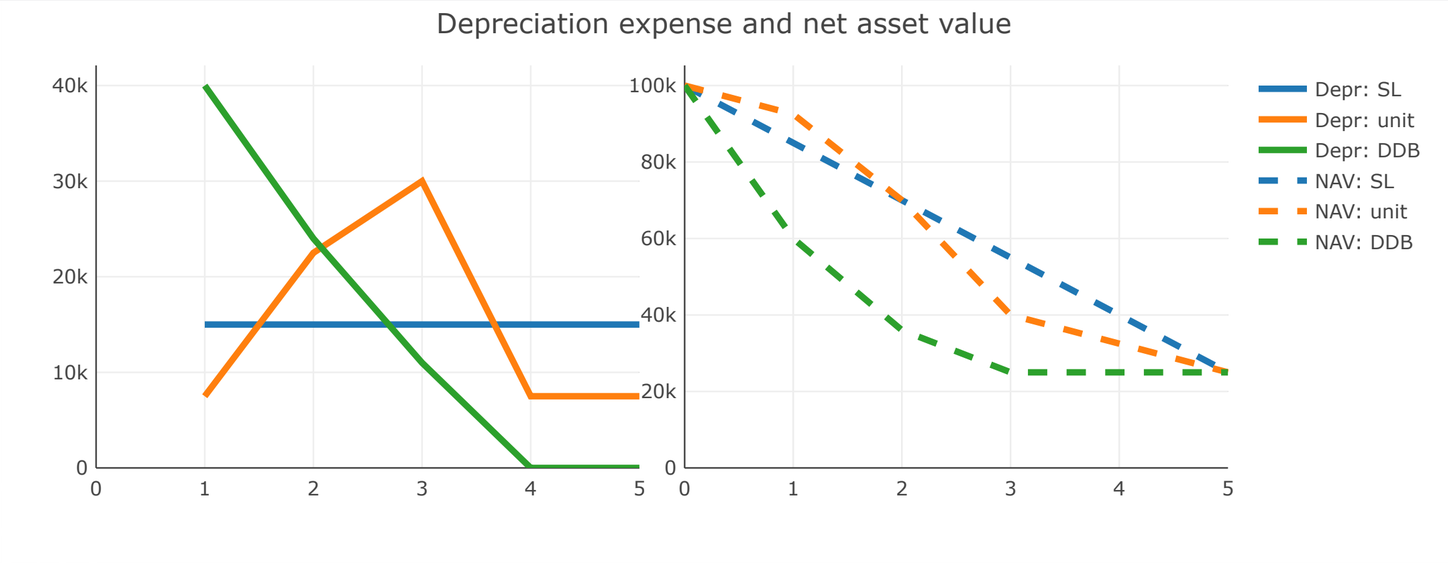
Depreciation comparison: no salvage value

Situation: You have a $100k asset which you will use for 5 years, with $0 salvage value. Determine depreciation using the 3 methods. Usage will be 10%, 30%, 50%, 10%, and 10% for each year.



Depreciation comparison: salvage value

Situation: You have a $100k asset which you will use for 5 years, with *$25,000* salvage value. Determine depreciation using the 3 methods. Usage will be 10%, 30%, 50%, 10%, and 10% for each year.



Natural resources

- Depletion
  - Just like *units of activity* depreciation
  - Different name as resources are *depleted* when mined
    - Meaning the amount of resources left has decreased

Example: Depletion

Date	Account	DR	CR
20YY.MM.DD	Depletion expense	550M	
	Accumulated depletion -- oil field		550M
Recorded depletion of oil fields of 11M units (barrels) at $50 per barrel			

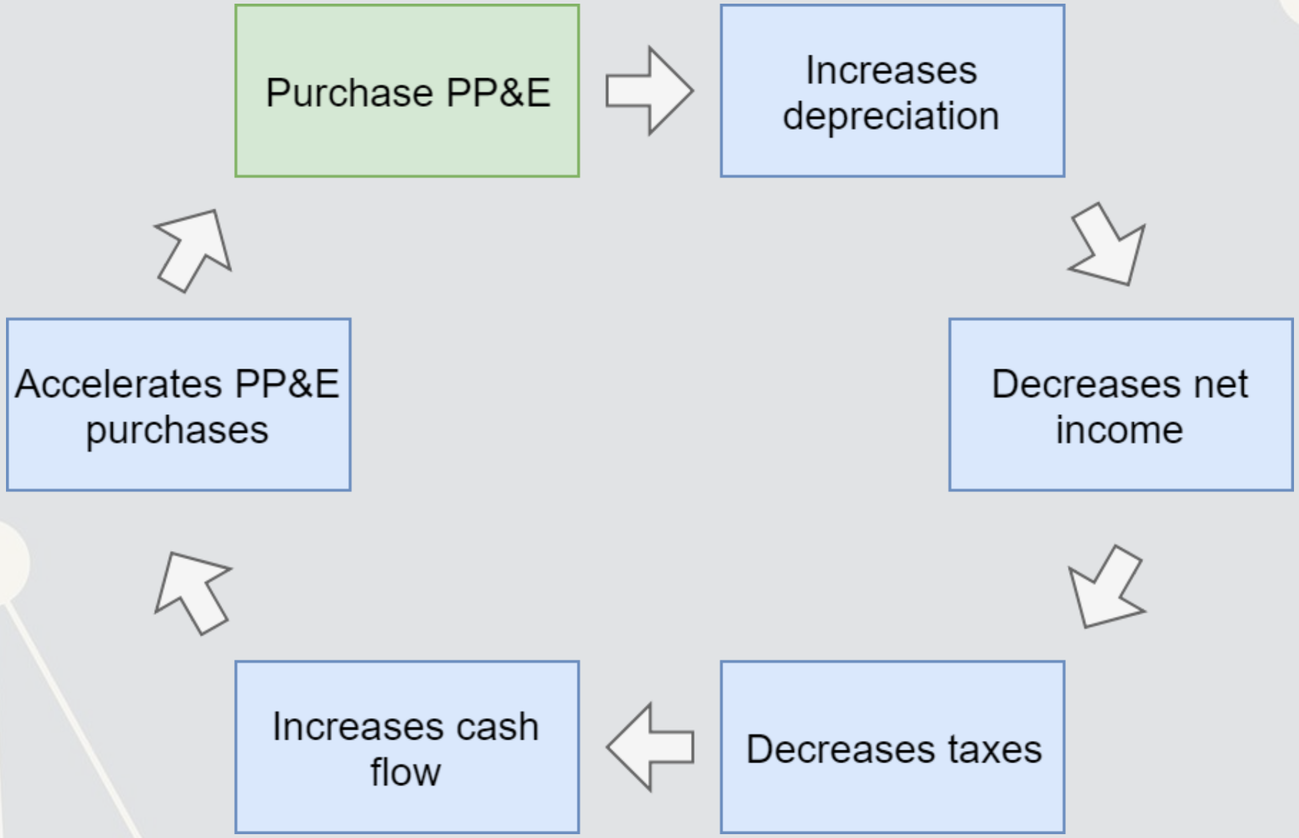
Notes on depreciation

- Useful life is an *estimate*
- Salvage value is an *estimate*
- Depreciation method is a *choice*
- 0 net asset value (NAV) $\neq$ unusable
  - NAV $=$ *asset value* minus its *accumulated depreciation*
  - You won't record any more depreciation after hitting 0

Other issues in PP&E

Income taxes

- Depreciation method affects your taxes!
  - This makes double-declining balance look more enticing



Long lives

- Partial years
  - Straight-line and DDB: Multiply yearly depreciation by $Months\ used/12$
  - Units of production: No change needed, as fewer units produced controls for this
- Many things change over time
  - This includes the accuracy of your depreciation assumptions
    - Length of time, salvage value
  - Increased life from maintenance is an example
- Use new assumptions going forward
  - Essentially treat as a new asset with a historical cost equal to the current NAV, for the purpose of depreciation calculations

Example of partial years

Situation: Bought an asset on September 30th for $10,000, with useful life of 7 years and $3,000 of salvage value.

What is depreciation under straight line and DDB for the asset as of December 31st of the same year?

- Months passed: 3 months
  - Oct, Nov, Dec
- Straight-line
  - Full year is: $\frac{10{,}000-3{,}000}{7} = 1,000$
  - Partial year is: $1,000 \times \frac{3}{12} = 250$
- DDB
  - Full year is: $(10,000 - 0) \times \frac{2}{7} = 2,857.14$
  - Partial year is: $2,857.14 \times \frac{3}{12} = 714.29$

Example of changing assumptions

Situation: Bought an asset on January 1st 20X0 for $10,000, with useful life of 7 years and $3,000 of salvage value, to be accounted for using straight line depreciation. In year 20X2 it was determined that the asset would only last 6 years in total, with 0 salvage value, and should be accounted for using DDB. What is the depreciation expense in years 20X0 through and 20X2?

- Years 20X0 and 20X1
  - Normal straight line problem:
    - $Expense = (10,000 - 3,000)/7 = 1,000$
- Year 20X2
  - Determine NAV (new cost): $10,000 - 1,000 - 1,000 = 8,000$
  - Years left: $6 - 2 = 4$
  - New Acc. Depr.: 0
  - $DDB = (8,000 - 0) \times \frac{2}{4} = 4,000$

Retirement

- *Retirement* = throwing the asset out
- Adjust the PP&E value to include partial depreciation (if any)
  - Same as usual depreciation methods
- Record retirement:

Asset at 0 net asset value (NAV)

- No gain or loss here

Example: Retirement at 0 net asset value

Date	Account	DR	CR
20YY.MM.DD	Accumulated Depreciation -- [PP&E]	X	
	[PP&E]		X
Recording retirement of [PP&E], asset has 0 net asset value			

Asset at > 0 net asset value

- Debit *loss on asset retirement*

Example: Retirement at positive net asset value

Date	Account	DR	CR
20YY.MM.DD	Accumulated Depreciation -- [PP&E]	X	
	Loss on asset retirement	Y - X	
	[PP&E]		Y
Recording asset retirement of [PP&E], asset has positive net asset value (Y > X)			

Sale

- Sale is like retirement, but you are receiving some cash instead of nothing.
- Adjust the PP&E value to include partial depreciation (if any)
  - Same as usual depreciation methods
- Record a sale:

Loss (NAV > Cash)

- Debit *loss on asset sale*

Example: PP&E sale for cash, loss

Date	Account	DR	CR
20YY.MM.DD	Cash	A	
	Accumulated Depreciation -- [PP&E]	X	
	Loss on asset sale	Y - X - A	
	[PP&E]		Y
Recording asset sale of [PP&E] for cash, asset has NAV > cash paid			

Gain (NAV < Cash)

- Credit *gain on asset sale*

Example: PP&E sale for cash, gain

Date	Account	DR	CR
20YY.MM.DD	Cash	A	
	Accumulated Depreciation -- [PP&E]	X	
	Gain on asset sale		A+X-Y
	[PP&E]		Y
Recording asset sale of [PP&E] for cash, asset has NAV < cash paid			

Exchange

- Exchange is the same as a sale, but with non-cash settlement
  - Ex.: Exchange machinery for a car
- Adjust the PP&E value to include partial depreciation (if any)
  - Same as usual depreciation methods
- Record an exchange:

Loss (NAV > Asset received)

- Debit *loss on asset sale*

Example: PP&E exchange, loss

Date	Account	DR	CR
20YY.MM.DD	[Asset received]	A	
	Accumulated Depreciation -- [PP&E]	X	
	Loss on asset sale	Y - X - A	
	[PP&E]		Y
Recording asset exchange of [PP&E], asset has NAV > value of asset received			

Gain (NAV < Asset received)

- Credit *gain on asset sale*

Example: PP&E exchange, gain

Date	Account	DR	CR
20YY.MM.DD	[Asset received]	A	
	Accumulated Depreciation -- [PP&E]	X	
	Gain on asset sale		A+X-Y
	[PP&E]		Y
Recording asset exchange of [PP&E], asset has NAV < value of asset received			

Example of disposal

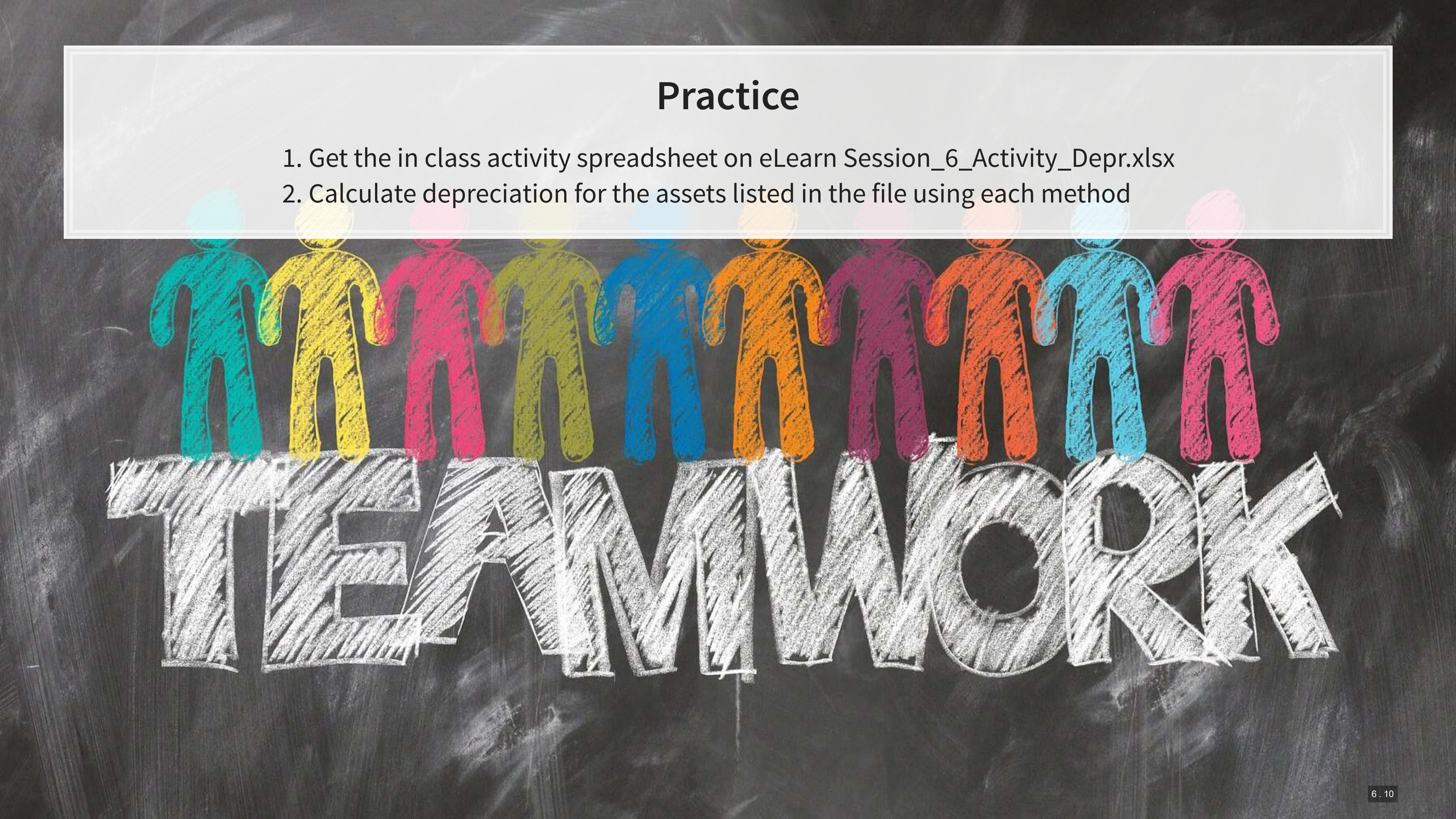
Situation: A machine bought for $10,000 has $4,000 of accumulated depreciation, but the firm no longer needs the asset. Record the following possible outcomes: 1) Disposal of the machinery; 2) Sale for $4,000 cash; 3) Exchange for an $8,000 Warehouse

Example: Hypothetical outcomes

Number	Account	DR	CR
1	Accumulated Depreciation -- Machinery	4,000	
	Loss on asset retirement	6,000	
	Machinery		10,000
Recording asset retirement of machinery, loss			
2	Cash	4,000	
	Accumulated Depreciation -- Machinery	4,000	
	Loss on asset sale	2,000	
	Machinery		10,000
Recording asset sale of machinery for cash, loss			
3	Warehouse	8,000	
	Accumulated Depreciation -- Machinery	4,000	
	Gain on asset sale		2,000
	Machinery		10,000
Recording asset exchange of machinery for warehouse, gain			

Practice

1. Get the in class activity spreadsheet on eLearn Session_6_Activity_Depr.xlsx
2. Calculate depreciation for the assets listed in the file using each method



Intangibles

What are intangibles?

- Literally “not perceptible by touch”
  - Things you can’t hold, but still have value
- Patents
- Copyrights
- Franchise rights
- Licenses
- Trademarks
- Goodwill (i.e. excess acquisition price)

Patents

- Most cited: US4683202A
  - Filed 25/10/1985
  - 8,252 citations

> The present invention is directed to a process for amplifying any desired specific nucleic acid sequence contained in a nucleic acid or mixture thereof. The process comprises treating separate complementary strands of the nucleic acid with a molar excess of two oligonucleotide primers, and extending the primers to form complementary primer extension products which act as templates for synthesizing the desired nucleic acid sequence. The steps of the reaction may be carried out stepwise or simultaneously and can be repeated as often as desired.

Patents

- Nortel patent sale
  - Over 6,000 patents
  - Consortium of Microsoft, Apple, Sony, RIM (Blackberry), EMC, Ericsson
  - **$4.5B**
- Merck Lawsuit against Gilead
  - Over patent infringement
    - Hepatitis C drug
  - **$2.54B*** jury verdict
    - 10% of all revenue

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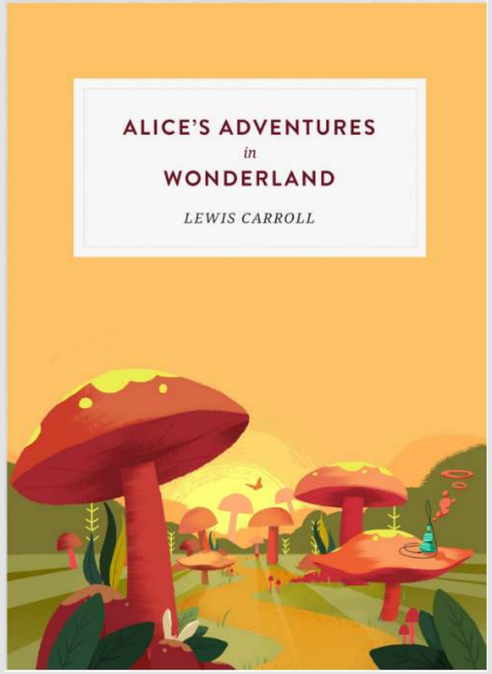

ALICE'S ADVENTURES IN WONDERLAND

BY
LEWIS CARROLL

WITH FORTY-TWO ILLUSTRATIONS
BY JOHN TENNIEL

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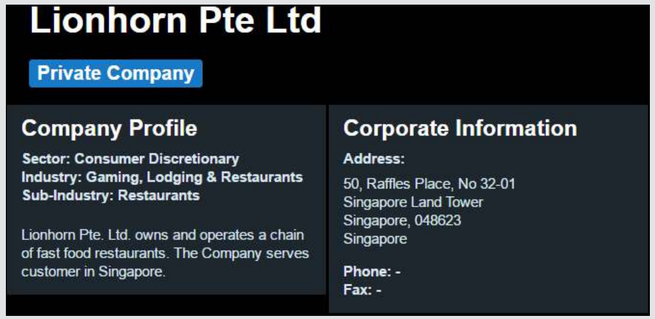
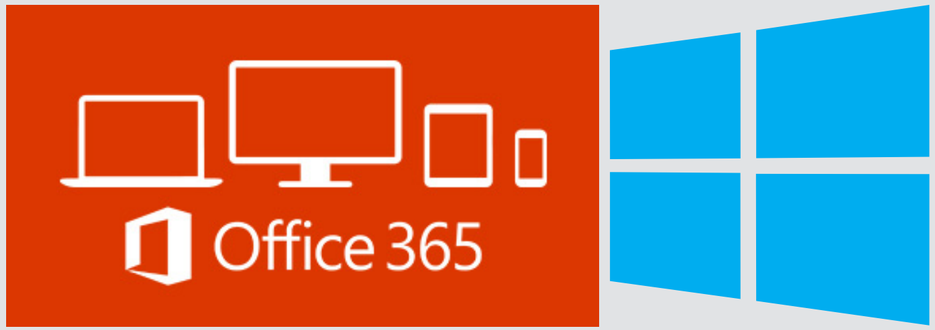


Licenses

- Software licenses
- Can be for a period or infinite
  - Periodic licenses treated as a prepaid expense
  - Infinite licenses treated as an asset
    - Unless the license usefulness is clearly limited



Trademarks

- ™ or ®

Goodwill

- The amount paid for a company in an acquisition above its **updated** book value
  - If price < **updated** book value, negative goodwill
- Microsoft bought LinkedIn
  - $25B price
  - LinkedIn had about $4B book value
    - Note: LinkedIn's assets were worth more than their book value
  - *As much as $17B was goodwill*

Valuing intangibles

- If internally generated
  - Legal costs for titles can be capitalized (registration costs)
    - Added to asset account
  - Generation costs are expensed
    - Exception: Development after Research can be capitalized under IFRS (IAS 38)
- If purchased
  - Record at cost

> Why do we have this difference? It's because purchases have more *reliable* values.

Valuing goodwill

- Goodwill comes from acquiring other firms
- We record new book values for each asset acquired
  - We use the *net asset value* of each asset for this
- To calculate goodwill:
  1. Start with the purchase price of the firm
  2. Subtract the *net asset values* of all assets
  3. Add back all liabilities
  4. What's left is goodwill

> Situation: Coffee Corp bought a rival coffeeshop for $100,000. The coffee shop has book values of assets and liabilities of $80,000 and $40,000, respectively. We estimate NAV to be $90,000. What is goodwill?

- Goodwill is $100,000 - $90,000 + $40,000 = $50,000
  - We ignore the old book value of assets

Common terminology confusion for goodwill

- Often we will collapse steps 2 and 3 together into a quantity called *Net assets*
  - $Net\ assets = Total\ assets - Total\ liabilities$

> *Net assets* and *Net asset value* are not the same!

- $Net\ asset\ value = Historica\ Cost - Accumulated\ Depreciation$

> Reworking the prior example: Net assets is $90k - 40k = 50k$

- To calculate goodwill:
  1. Start with the purchase price of the firm
  2. Subtract *net assets*
  3. What's left is goodwill
- Goodwill is $100,000 - $50,000 = $50,000

What about depreciation?

- Intangibles are not physical items, so they doesn't depreciate
- They *can* lose value over time

Solution:

- For infinitely lived items:
  - Revalue when doing financial statements
  - If market value is lower than the intangible's value in our books, we *impair* the value
- For finitely lived items:
  - Amortize their value
  - Works like straight line depreciation with 0 salvage value
  - Check impairment as well

Impairment

- Debit *Impairment expense*
- Directly record decrease to the asset (Credit)
- We can impair PP&E as well

1. We bought a competitor for $800: $400 of machinery and $400 of goodwill (for their R&D).
2. We realized that the R&D we paid extra for had no value.
3. We realized we overpaid for the machinery by $200.

Example: Impairment

Date	Account	DR	CR
20YY.MM.DD	Machinery	400	
	Goodwill	400	
	Cash		800
Purchased competitor for $800. Goodwill of $400 is for the R&D of the company.			
20YY.MM.DD	Impairment expense	400	
	Goodwill		400
Impaired goodwill completely			
20YY.MM.DD	Impairment expense	200	
	Machinery		200
Impaired machinery by half			

Note: Technically this account is called “impairment loss,” but it is an expense account despite having loss in the name. Either will be fine for this course.

Amortization

- Amortization is like depreciation for intangibles
- Debit Amortization expense
- Credit accumulated amortization
- Always use straight-line with 0 salvage value
- Example:

1. Bought a patent for $100 cash. It has 5 years of life.
2. Recorded amortization after 1 year.
3. Recorded amortization after another year.

Example: Amortization

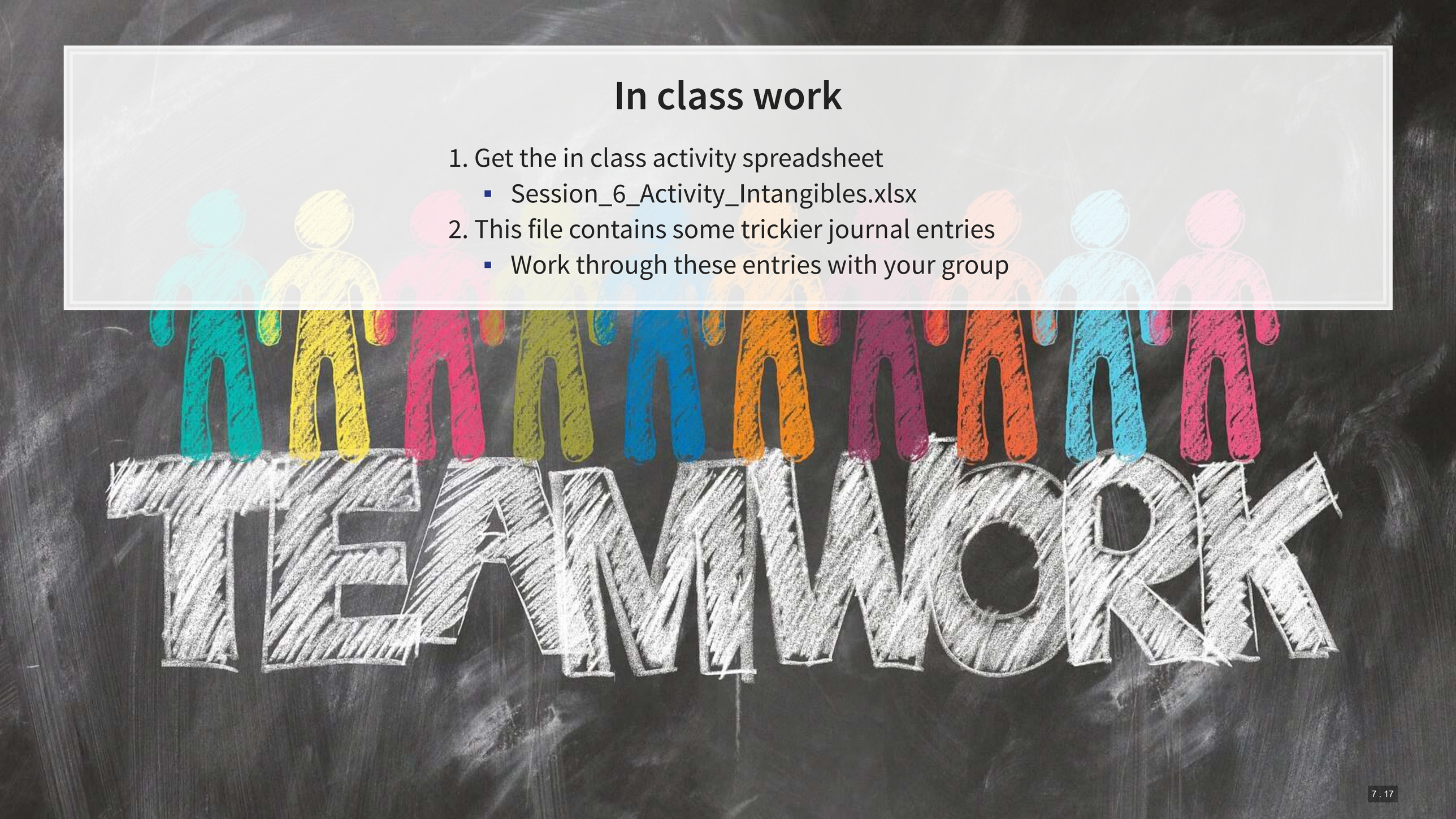
Date	Account	DR	CR
20Y1.01.01	Patents	100	
	Cash		100
Purchased patent for $100			
20Y1.12.31	Amortization expense	20	
	Accumulated amortization -- patents		20
Amortized patent: 100/5 = $20			
20Y2.12.31	Amortization expense	20	
	Accumulated amortization -- patents		20
Amortized patent: 100/5 = $20			

Notes on Intangibles

- Determining the life of intangibles:
  - Often, this is based on a country's laws
    - Copyright duration is set by each country
    - Trademark law determines trademark life
  - Mergers will be infinitely lived, but are often impaired

In class work

1. Get the in class activity spreadsheet
   - Session_6_Activity_Intangibles.xlsx
2. This file contains some trickier journal entries
   - Work through these entries with your group



End Matter

Wrap up

- For next week
  1. Reading
     - Chapter 8 (Liabilities)
     - Tricky subject, reading highly recommended
     - We’ll spend 2 weeks on liabilities
  2. Homework 3: Valuation
     - Due next week
  3. Practice on eLearn: Journal entries #2
     - Focused on PP&E
     - Automatic feedback provided

Packages used for these slides

- kableExtra
- knitr
- plotly
- revealjs