• **Individual Retirement Accounts (IRA’s)**
  
  – Special type of account you set up at bank, credit union, or other financial institution
  
  – It’s not a specific investment, it’s like a ‘container’ that will contain other investments (bank accounts, stocks, bonds, mutual funds, etc)

  – **Benefits of Traditional IRA**
    
    * **contributions are tax exempt:** You may be able to claim contributions to IRA as an income tax deduction (depending on your income and other factors)
    
    * **tax deferral for earnings:** The earnings on an IRA are not taxed until they are withdrawn
      
      · So you can earn interest on your earnings for years, and only later have to pay taxes.

  – **Limitations of Traditional IRA**
    
    * **contribution limit:**
      
      · There is a limit on how much you can contribute to an IRA in one year.
      
      · $5,500 per year or $6,500 per year if you’re over 50 years old are 2014 limits
      
      · Limits go up with inflation
    
    * **when money is withdrawn**
      
      · Money in the IRA cannot be withdrawn until you’re 59\(\frac{1}{2}\) years old.
      
      · You must start withdrawing (a certain amount of money) by the time you’re 70\(\frac{1}{2}\) years old.

• **Roth IRA**
  
  – The income you earn from your investment in a Roth IRA is *not taxed*
  
  – However you can’t deduct the money you contribute from income taxes.
  
  – There are withdrawal rules, but they are less strict than traditional IRA.
• Summary of Taxes and IRA’s
  – Traditional IRA
    * It’s possible to save $ on income taxes NOW by putting the money in a Trad. IRA.
    * You will pay income taxes LATER (in retirement) on the money you withdraw from Trad. IRA.
  – Roth IRA
    * You pay income taxes NOW on the money you put into a Roth IRA.
    * You don’t pay income taxes LATER (in retirement) on the money you withdraw from a Roth IRA?

   – How Do You Decide Which is Better?
     Wait will we’ve done an example.

• 401(k)
  – Type of (DC) retirement account offered by employers as a benefit
  – Employer picks a plan administrator (particular bank, insurance company or mutual fund company)
  – Employee picks from among the different investments (e.g. mutual funds) offered by the administrator.
  – Sometimes employers match contributions, in this case a vesting schedule will apply.

   – benefits of 401(k)
     * contributions are tax exempt: The money that is deducted from your paychecks and added to your 401(k) is tax exempt.
     * tax deferral for earnings: Taxes on earnings are deferred until the money is withdrawn (like traditional IRA)

   – limitations of 401(k)
     * There are limits on how much you can contribute (they are high enough that ‘ordinary’ people don’t reach them)
useful formulas

• Money Growth in IRA

Money grows in IRA (Traditional or Roth) using the compound interest formula:

\[ FV = PV(1 + i)^n \]

• Contributions to 401(k) retirement Plans

\[ FV = PMTs_{\overline{n}|i} \]

- Determine how often they contribute (monthly, every 2 weeks, etc)

- Use annuity formulas \( FV = PMTs_{\overline{n}|i} \) to determine the needed total PMT into account to meet the person’s stated FV goal.
  (this is the total that needs to go into the account from them and their employer combined.)

- Determine how much of the PMT the employee pays:
  
  * E.g. the company matches 40%, and the needed payment is \( PMT \) use
  (Total contributions= 100% employee + 40% employer = 140%)
  \( (1.40)(\text{employee’s contributions}) = PMT \)

  * **CHECK** If the answer above puts the company’s contributions over the max, instead
  E.g. if they company matches 40% up to 5% of salary.

  Find 5% of employee’s salary, check if employee’s contributions from above is below this limit.

  \( (\text{person’s contributions}) = PMT - (\text{company max contributions}) \)
1. Johan has $4,000 he wants to invest in an IRA. We will assume this is a before tax amount (meaning that if he has to pay income taxes on this money, he will take the taxes out of the $4000 and invest less).

For the investment he’s chosen, he expects the money to earn 7.3% a year. He plans to leave the money in the account for 35 years. We can assume that in combined federal, state, and local taxes, Johan’s tax rate is about 28%.

(a) If Johan invests the money in a Roth IRA,
   i. Does he have to pay taxes on his $4000? if yes, how much?
   ii. How much money will be in the account at the end of 35 years?
   iii. How much will Johan pay in taxes when he withdraws the money?
   iv. How much will Johan save in taxes (today) by contributing the money to the IRA?

(b) If Johan invests the money in a Traditional IRA,
   i. Does he have to pay taxes on his $4000? if yes, how much?
   ii. How much money will be in the account at the end of 35 years?
   iii. How much will Johan pay in taxes when he withdraws the money?
   iv. How much will Johan save in taxes (today) by contributing the money to the IRA?

(c) (Just for fun) Compare the amount of money Johan has access to in 35 years (taking into account taxes) with both IRA options.

2. Three triplets James, Jill, and John each decide they (individually) would like to have $800,000 saved up for retirement. They all plan to retire in 40 years.

(a) James works for a company that offers a 401(k) with no matching. He expects his investment to earn 7%, how much does James need to contribute each month?

(b) Jill makes $42,000 working for a company that will match contributions 50% up to 9% of her salary with their 401(k). If Jill also assumes that her investment will earn 7%, how much does she need to contribute to her 401(k) each month to meet her goal?

(c) John makes $37,000 a year working for a company that will match 75% of his contributions to his 401(k) up to 4% of his salary. If John also assumes that his investment will earn 7%, how much does he need to contribute to his 401(k) each month to meet his goal?
3. (Optional) Jeffery is 28 and makes $36,400 a year working for a company that pays him biweekly (26 times a year). Jeffery plans to retire at age 65 (in 37 years). Jeffry wants to plan to live till he’s 95 (so he plans to be retired for 30 years). Right now Jeffry’s retirement account is earning 7.5% interest.

(a) Once he retires, (after taking into account social security, assuming he has already paid off his house, and assuming very low inflation) Jeffry estimates he’ll need to withdraw at least $1,200 every 2 weeks from his retirement account to meet all his expenses. Assuming he will withdraw the minimum $1,200 every 2 weeks for 30 years, and that the account will still earn 7.5%, how much money does Jeffry need in his retirement account at the start of his retirement?

(b) Now that Jeffry knows how much money he needs in his account at age 65, (the answer to a), he wants to know how much he needs to contribute to the account to reach that goal. What biweekly payments need to be made to Jeffry’s retirement account for it to accumulate the desired amount of money by the time he is 65? (Assuming the account continues to earn 7.5%)

(c) Since Jeffry’s company will match 40% of retirement account contributions up to 7%, how much of his salary does Jeffry need to contribute (as a minimum) to meet his retirement goals?

Note: This is a minimum for Jeffery, if his accounts earns less interest at any point, if there is inflation, or if something changes with social security benefits, etc he will likely need more money.