Finance Worksheet

Project GRAD
(Values from Fall 2010)

1. Short Term Saving. Smartypig (`http://www.smartypig.com/`) has short term savings accounts with 1.75% APY.

   (a) If you can save \$50 a month, how long will it take to buy a \$750 TV. (Assume that your down payment is also \$50.)

   (b) If you can save \$100 a month, how much will you have when you finish college? (Assume you will finish college in 42 months if this is a Fall semester, or in 36 months if this is a Spring semester. Also, assume you open your account with \$100.)

   (c) If you want to have $\$5,000$ for a trip to Europe when you finish college, how much will you need to save every month? (Use the same timeline as above: 42 months if this is a Fall semester, or in 36 months if this is a Spring semester. Assume that you start with 0 dollars.)

   (d) Make up your own examples!

2. Car Loans. You want to buy a car. You can find some loan rates at `http://www.bankrate.com/`. You can find car prices from `http://www.edmunds.com/`.

   (a) If you plan to buy a $\$8,000$ used car in 36 months, the lowest rate (APR) from the web site above is 3.65%, highest is 6.50% and the average is 5.576%. Check what your monthly payments would be in those cases, assuming there will be no down payment. (Also, see how different down payments would affect your monthly payments.)

   (b) If you want to buy a new Honda Civic LX (automatic), the average price for Knoxville is $\$16,775$ plus 9.75% of sales taxes. The 60 month loan rates for cars have minimum 3.15%, average 4.56%, and maximum 6.24%. How much would your monthly payments be? How about if you buy a Hyundai Accent (automatic with typical "Premium Equipment Package"), which costs $\$14,639$ (plus taxes). Assume you can put a down payment of \$1,000. (Check different down payments.)

   (c) Check the payments above with "promotional" rates such as 0.9% for 36-months and 1.9% for 60 months.

   (d) Suppose that for you to have a promotional 1.9% for 60 month on the Honda Civic, you need a down payment of $\$3,000$. (I'm making up this number.) If you can save \$150 (change this number if you want) a month and use Smartypig (assume you open the account also with \$150), how long until you can buy the car, and how much will the payments be?

(e) How about if you want to buy the car within a year in the previous example? How much will you have to save every month in Smartypig? (Assume that you open the account with the same amount that will be your monthly deposits.)

(f) (Harder!) Suppose that you can only afford $250 a month, but you want to buy the Honda, as above (with 1.9% APR for 60 months). So you start saving that with Smartypig until you have the necessary down payment to make your monthly payments equal to $250. How much is the down payment and how long will it take for you to save it.

3. MORTGAGES. I've found some houses at `http://www.homesforsaleknoxville.com/` and rates at `http://www.bankrate.com/`. The (fixed) rates for 30 year mortgages vary from 4.3% to 4.8%.

   Here are some houses:

   - **2 Bedroom Condo in South Knoxville**:
     - Type: Condominium.
     - Style: Traditional.
     - Bedrooms: 2.
     - Bathrooms: 2.
     - Basement: Yes, Slab.
     - Size: 1,032 sq. ft.
     - Lot Size: 43.69ft x 90.51ft.
     - Year Built: 2003.
     - Taxes: $639.00 (2009). Condo Fees: $65.00.
     - **Price:** $105,000.
   - **3 bedroom in Fountain City**:
     - Type: Residential.
     - Style: Ranch.
     - Bedrooms: 3.
     - Bathrooms: 3.
     - Garage: Double, Attached.
     - Basement: No.
     - Size: 2,034 sq. ft.
     - Lot Type: Rectangular, Lot Size: 0.37 acres, 59ft x 224ft.
     - Year Built: 2006.
     - Taxes: $1,300.62 (2008).
     - **Price:** $209,900.
   - **4 Bedroom House in Faragut**:

- Style: Traditional.
- Bedrooms: 4.
- Bathrooms: 2.
- Garage: Double, Attached.
- Basement: Yes, Full "Finished".
- Size: 3,546 sq. ft. Lot Type: Irregular. Lot Size: 1.1 acres, 137ft x 332.92ft.
- Year Built: 1979.
- Taxes: $2,037.86 (2010).
- **Price:** $389,900.

(a) Check your monthly payments for those homes with a down payment of 10% of the property value. (You should try different down payments.) Remember to take into consideration the condo fees (if any) and annual taxes (divide it by 12 and add to the monthly cost).

(b) Also, if you can afford $1,000 a month, with a down payment of $20,000 and an APR of 4.65%, what is the most expensive home you can buy financing in 30 years?

(c) (Harder!) If your $1,000 a month must also be used to pay the annual taxes, say 0.5% of the value of the house, then what is the price of the house you can afford?

(d) Try with different numbers too!

4. Retirement.

(a) If you can save $600 a month and plan to retire in 40 years, how much will you have at that point? Assume that the APY for the next 3 years will be 1.5%, for the next 5 years 2.5%, 3.5% for the following 10 years, and 4% after that. (Assume you start with $5,000 in your account.)

(b) You want to retire right now. You've saved $700,000 in a savings account that now has 3% APY and you need $2,500 a month for your expenses. How many years can you live out of your savings until you run out of money?

(c) Now suppose you have $700,000 in a savings account that now has 3% APY, but you project that you will leave for at most another 30 years. How much can you withdraw a month?

(d) (Harder!) You want to plan your retirement. You are 25 years old, project that you will live to be 100, you have already 5,000 saved, can save $600 a month, and you need $2,500 a month for expenses once you retire. How long will it take for you to retire. (So, you will save until you have enough in order to be able to withdraw $2,500 a month for the rest of your 100 years.) You can assume a fixed APY, like 3.5% or you can use the variation of APY in the first item.

(e) (Even harder!) Repeat the above taking inflation into account. Say, that we have inflation of 1% a year. (This is like an APY, not APR, and it is compound continuously!)