

Mathematics in Modern Society
Finance Project
Section 001, Tom LaGatta, Spring 2006

In this project, you will investigate the process of buying a house. For the purposes of this project we will assume that you are going to graduate this semester, get a job, and begin saving for your first house. You will plan to buy your house five years from now. At that time you will use the money you've saved as a down payment and take out a loan for the rest of the cost of the house.

- Each project assignment must be neatly typed. You must use complete sentences to answer all questions.
- Formulas may be typed using proper formatting or written neatly in ink.
- Outside sources will be needed and should always be cited, in MLA format.
- The due dates for each assignment will be posted on the class website.

Tentative due dates:	Assignment 1	March 9 th
	Assignment 2	March 23 rd
	Assignment 3	April 6 th
	Assignment 4	April 13 th
	Assignment 5	April 20 th
	Optional Rough Draft	April 25 th
	Final Report	May 2 nd

- The project assignments will eventually be used to create a final report and should all be done with this in mind. For example any mistakes made in a project assignment should be understood and corrected right away so that the correct information is ready to be used in the final paper.

Assignment 1:

10 points

In order to buy a house, you'll need a job. Find a job that is realistically obtainable with a degree in your major. Remember that we are assuming you graduate this semester and start working. Of course you may want to go to law school, go to graduate school, join the Peace Corp, or do something else. However, for this project just go with the assumptions.

The Career Services Office (Student Union at UA) may have some resources that will be helpful. There are websites that would also be useful. If you are currently employed in the profession of your choice, estimate your salary if you had completed your undergraduate degree.

1. Give the job title and the source of your information. Include the city and state of the job. If there are multiple locations, choose one.
2. Provide a job description. This should be at least several sentences long but no longer than one page. This can be in your own words or a cited reference.
3. State the starting salary for the job.
4. Make realistic projections with regards to your salary for five years after graduation. This may be the salary for someone in the same position with 5 years experience or an adjustment based on inflation. Explain your method of determining the future salary.

Assignment 2:**10 points**

You will need to approximate how much money you can save towards a down payment in the next five years. Be realistic. Most people can only realistically save about 5% of their salary each year. Remember you will be paying federal, state and social security taxes. You will need to deduct these amounts from your salary before you can make any estimates about how much can be saved towards the down payment.

1. Find the federal, state, local and social security taxes that will be deducted from your pay. It is possible to find formulas or tables of tax rates for the federal, state and social security taxes. Give your source. If there are no state or local taxes where you intend to live then say so. Do not just neglect to mention a type of tax.
2. State your yearly and monthly income after taxes. This is your net pay.
3. Make a tentative monthly budget for the five years after graduation.

This should include

- rent
- utilities
- food
- car loans
- insurance (car, health, renter's...)
- student loans
- entertainment
- clothing
- miscellaneous (between 25 and 30% of your salary)

There are always expenses that we do not anticipate but must be prepared for. For example your car will need repairs, you may need to go on an unexpected trip for a wedding or funeral, you may find a great deal on a plasma TV. The miscellaneous category is for these expenses.

4. Subtract the expenses in your budget from your net pay to determine how much money you can save each month. This amount should be no more than 5-10% of your net pay. If it exceeds this amount, you should either check your budget items to see if you forgot something or give a good explanation of why you think you can save this amount.

Assignment 3:**10 points**

What will you do with the money you are able to save each month? Invest it of course.

1. Find an account to invest your money into. State the name and type of account. State the interest rate. Be careful to check for things like minimum monthly balances. If you find the account using the internet, please print out the page which provides the information and include it with your assignment.
2. Use the amount of money you will be able to save, the interest rate you have found, and your knowledge of annuities to compute how much money you will have after 5 years. Don't forget to include any formulas you use. This would be a good time to start the list of formulas for your final project if you haven't already done so.

Assignment 4:**10 points**

Now that you know how much you have for a down payment, you need to start researching the home. First, start with the affordability guidelines (Consumer Math section 6.4) to decide what your price range is. Don't forget to show all your calculation. Once you have ascertained how much you can afford to spend on a home, you can start looking for a home through the internet, the newspaper, or by talking to a real estate broker.

If you decide to talk to a real estate agent, broker, or banker you should keep some courtesies in mind:

- Let them know you are working on a project for a class you are taking and not actually in the market for a house. Some businesses pay their employees on commission. For this reason and others some people may not want to spend time with you. Others will gladly help you out. Be sure to be up front with them so they have the option of whether or not they want to help you.
- Try to choose a time when their offices are not busy. Morning and afternoons are probably good; weekends and lunch hours are probably not good times.

Here are the specific problems for this assignment.

1. Restate the amount of money you expect to have saved after 5 years. Assuming this is a 20% down payment, what is the total cost of the house you can buy?
2. Restate your projected salary (assignment 1 problem 4). Assuming you buy a house that does not cost more than 3 times your annual salary, what is the maximum total cost of the house you can buy?
3. Whichever is the lower of the total costs you found in problems #1 and #2 is your maximum price. Find yourself a house! Attach a print out of the Multiple Listing Service (MLS) for your house. You may purchase a condominium if you prefer.

If there are no houses or condominiums listed in your price range, then attach the MLS print out for the closest listing you found and see me.

Assignment 5:**10 points**

Now you need to take out a loan to buy the house. In today's housing market there are many loan options. For the purposes of this project we will restrict our search to fixed or adjustable rate mortgages with at least a 20% down payment. (The list of assignment 5 problems is continued on the next page.)

1. Choose a mortgage.

If you decide to talk to a professional please refer to the courtesy points above.

Don't forget to check on the following:

- Requirements for down payment
- Origination fees
- Discount fees
- Mandatory mortgage insurance

Include at least the following information about the mortgage.

- Name of the bank issuing the loan
- If the mortgage has a fixed or adjustable interest rate
- The interest rate
- Itemized list of closing costs

2. List all of your monthly housing expenses. This should include at least mortgage payment, property taxes, and homeowner's insurance. There may also be other fees, for example homeowner's association fees. If the total is more than 25% of your projected monthly income, then adjust the expenses (for example: extend the mortgage). You should turn in a list that is not more than 25% of your projected monthly income.
3. Discuss the process of choosing a mortgage. Explain as clearly as possible what the issues were and why you made the choices you did. This should be 1 to 1 ½ pages double spaced.

**Final Report:
points**

50

Now it is time to compile your final report. Your audience is people who are interested in buying a home but do not know where to start. You can think of the report as being a resource for a community center, or a booklet a bank would give to prospective home buyers. Write an appropriate title and outline for your report. Do not refer to the project assignments by number. The project assignments were the background work; your audience does not know about them. Don't forget to correct any mistakes made in the project assignments before including the information in your final report. The focus now is to present a complete, coherent, professional report.

Your project must include:

- Title page
- Table of contents
- Introduction (discussing the goal of the project)
- Body (information from all portions of project assignments 1- 5)
- All formulas used for calculation (as in the assignments these may be word processed or written in ink, they must be in correct format)
- Conclusion (summarize the important points about your salary, home, and loan)
- The Multiple Listing Service (MLS) picture of your home.
- List of formulas used in your project- each entry must include
 - A name for the formula
 - A formula in proper format (word processed or written clearly in ink)
 - A definition of each variable
 - A brief (about one or two sentences) description of the formula use

Example:

$$\text{Future value of a monthly annuity: } F = PMT \times \frac{\left(1 - \frac{r}{12}\right)^{12t} - 1}{\frac{r}{12}}$$

F is the future value
 PMT is the monthly payment
 r is the annual interest rate
 t is the time in years

When saving for a down payment, money is invested into a savings account each month. This formula is used to calculate the total amount available for a down

payment by taking into account the amount saved each month and the interest rate of the account.

- List of references
 - This includes any banks, realtors (and the names of the individuals you received information from), websites and newspapers.
 - These should be cited throughout the paper

Appendices: an organizational option

You may include calculations in the body of your report or you may choose to give only the results in the body and cite an appendix for the calculations.

For example:

The total closing costs for this loan is \$2,000 (appendix A.1).

At the end of the report you would include an appendix and in section A.1 provide an itemized list of the closing costs.

Your report must be typed and double-spaced. The text of your report should be 4- 7 pages before including the calculations. It should be free of errors in spelling and grammar. It will be graded for a demonstrated understanding of the project, completeness, correctness, organization, following instructions, and professional formatting.