# Revised MAT116 Project
## Advising a Client on Retirement

Now that you have found a price for your team's stock option, we can now expand the scope of the Project to create a more interesting scenario. We will use the stock option as part of a larger task, which is to advise a client on his/her retirement plan.

Your team data file now has specific information about a hypothetical client who has come to you for advice on how to plan for retirement. You will be given the following information about your client, some of which you've already seen.

| INFORMATION | COMMENT | EXAMPLE |
|---|---|---|
| **STOCK OPTION INFO** | Info relevant to your team's stock option. | |
| Company Name | Gives the name of the company who's stock option you'll price. | Disney |
| Ticker Symbol | | DIS |
| Strike Price | The strike price for your stock option. | $30.00 |
| Option Period | The option period, in weeks. | 20 |
| Risk Free Rate | This is the rate at which you assume your stock grows during the option period | .040 |
| Lump Sum Cash for Options | This is a one-time lump sum of cash your client will invest into stock options for you team's given company. The number of options will depend on the Lump Sum available and the price of the option. | $12,000 |
| Proposed Closing Price | This is the proposed/hypothetical closing price you'll assume actually occurred at the end of the stock option period. You'll use this to determine if and how much profit your client made by purchasing the options. | $33.00 |
| **CLIENT INFORMATION** | Information on your client | |
| Current Age | This is your client's current age. | 35 |
| Retirement Age | This is the age at which your client would ideally like to retire. (It may not be possible to do this, however.) | 64 |
| Expected Age of Death | This is the age to which the client thinks he/she will live. | 90 |
| Financial Goal at Retirement | This is the total amount of money (future value) the client hopes to have saved up in all his/her retirement accounts at retirement. | $1,500,000 |
| **INVESTMENT INFO** | This is info on your client's current investments and rates of contribution. | |
| Current 401K Balance | This is your client's current balance in his/her 401K retirement account. | $55,000 |
| 401K Monthly Contribution | This how much you client plans to contribute each month to his/her 401K account. | $500 |
| Current Roth IRA Balance | This is your client's current balance in his/her Roth IRA account. | $12,000 |

| Yearly Roth IRA Contribution | This is the amount of money your client hopes to contribute every year to his/her Roth IRA. The current maximum is $4000. You will need to divide this amount by 12 to find the monthly contribution. | $2400 |
|---|---|---|
| Current Stock Portfolio | This is your client's current stock portfolio balance. After you price your stock option and compute how much profit (or loss) your client made on their stock options, the portfolio balance will be adjusted and assumed to grow from that point on. | $16,000 |
| Assumed Rate of Growth (while still working) | This is the average annual rate of return you will assume your client's investments grow by until they retire. | 7.5%  (0.075) |
| Assumed Rate of Growth (while in retirement) | This is the average annual rate of return you will assume your client's investments grow by during retirement. This will typically lower than the rate of growth assumed before retirement. | 5.5% (0.055) |
| Inflation Rate | This is the annual rate of inflation you'll assume for the project. | 3.2% (0.032) |

With your stock option priced, you will use the data above to determine how each of your client's investments (401K, Roth IRA, Stock Portfolio) grows between now and the time of retirement, their total resources available at retirement, and kind of income they will receive during retirement from their investments. (We exclude any consideration of Social Security income in this project.). You will also examine what impact inflation has on your client's investment balances and annual income.

Here are the key questions you should be able to answer for the project:

1.   What are the balances at retirement of each of your client's investments (401K, Roth IRA, Stock Portfolio)? Also, what is the total amount of money your client has at retirement?
2.   Taking into account the effects of inflation, what are the present values of each of your client's retirement-age investments? Also, what is the present value of your client's total retirement-age balance?
3.   What yearly and monthly amount of money (in future dollars) can your client expect by annuitizing his/her retirement funds?
4.   What is the present value of the monthly and yearly amount of money your client can expect by annuitizing his/her retirement funds?
5.   What effect does inflation have over time (during retirement) on your client's annual income?
6.   What general advice would you give to your client about retirement? You should be build an Excel spreadsheet that allows you to change various parameters and see how such changes affect your client's retirement scenario.

# MAT116 Project 3 Diagram

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┌──────────────┐        ┌──────────────┐
│  Lump Sum    │        │  Starting    │
│  Cash        │───────▶│  Stock       │
│  Invested in │        │  Portfolio   │
│  Stock       │        │  Balance     │
│  Options     │        └──────────────┘
└──────────────┘               │
                               ▼
                        ┌──────────────┐
                        │ Profits From │
                        │ Options      │
                        │ Added to     │
                        │ Current Stock│
                        └──────────────┘
                               │
┌──────────────┐              ▼
│  Client's    │        ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│  Current Age │        │ New Stock    │   │ Current      │   │ Current      │
└──────────────┘        │ Portfolio    │   │ 401K         │   │ Roth IRA     │
                        │ Balance      │   │ Balance      │   │ Balance      │
                        └──────────────┘   └──────────────┘   └──────────────┘
                               │                  │                  │
                               ▼                  ▼                  ▼
                        ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
                        │ No New       │   │ Monthly      │   │ Monthly      │
                        │ Contributions│   │ Contributions│   │ Contributions│
                        │              │   │              │   │ based on     │
                        │              │   │              │   │ Annual       │
                        │              │   │              │   │ Amount       │
                        └──────────────┘   └──────────────┘   └──────────────┘
                               │                  │                  │
┌──────────────┐              ▼                  ▼                  ▼
│  Client's    │        ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│  Retirement  │        │ Retirement   │   │ Retirement   │   │ Retirement   │
│  Age         │        │ Portfolio    │   │ 401K         │   │ Roth IRA     │
└──────────────┘        │ Balance      │   │ Balance      │   │ Balance      │
                        └──────────────┘   └──────────────┘   └──────────────┘
                               │                  │                  │
                               └──────────┐      ▼      ┌───────────┘
                                          ▼            ◀
                                   ┌──────────────┐
                                   │ Total        │
                                   │ Retirement   │
                                   │ Assets       │
                                   └──────────────┘
                                          │
                                          ▼
                                   ┌──────────────┐
                                   │ Annual and   │
                                   │ Monthly Income│
                                   │ during       │
                                   │ Retirement   │
                                   └──────────────┘
                                          │
                                          ▼
                                   ┌──────────────┐
                                   │ Balance at   │
                                   │ Death = $0   │
                                   └──────────────┘
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