**Coursework 3: Corporate Finance**

**Independent Problems (Total of 30 points):**

1. Suppose you and a friend each invest $450,000 in an idea you have for a new business (What-a-Co, hereafter, WC). You each get 900,000 shares valued at $0.50 each. On top of that, you are able to convince a bank to lend you $100,000.
2. What does your balance sheet look like at this point?
3. After a year, WC is in need of additional capital so you can start to work on a prototype. You contact VC1 about a first-stage venture investment. You are able to convince VC1 that your idea is worth $6,000,000. They agree to invest $3,000,000 for a 33.33% stake in the business. This is done by each of you selling 300,000 of your shares to the VC. What value is the VC implicitly agreeing to for you and your partner? What does your balance sheet look like after this first-stage investment? (assume loan is paid off and cash is gone)
4. Now another year goes by and your business is flourishing. You have a well-functioning prototype and are ready to launch your product. You hope to go through an IPO in another year or two. You need an additional $15,000,000 investment. You talk to VC1 and they recommend VC2 and VC3 as an additional sources of capital. You all agree on a valuation of $60,000,000. Of the $15,000,000 investment, $10,000,000 will come from VC2 & VC3 for a 1/12 stake each, while VC1 will contribute $5,000,000 to maintain 33.33% ownership. What does your balance sheet look like after this second-stage investment (assume you have acquired $2 million in fixed assets up to this point, and assume that all previously raised cash has been spent)?

1. Assume that Cerevel Therapeutics (Ticker: CERE) currently sells for $32.50 per share and has a volatility of 50% per year. The risk-free rate is 5% per year.
2. Construct a binomial tree with one period that is 3 months in duration.
3. What is the value of a 3-month at-the-money call option on CERE based on the tree you constructed in (a).
4. Now construct a binomial tree with 3 monthly periods and re-value the call option from part (b).

1. Now value an at-the-money European put option on CERE based on the two different trees you constructed.
2. Repeat part (d) with American option on CERE. Explain now why it is particularly important which of the two trees you use for valuation purposes.
3. You are interested in investing in a new technology venture called Voice Activated Ignition, Inc. (VAI). You are forecasting sales to be $20 Million when they go public in 3 years. Comparable companies are selling for 4x Sales. VAI needs $2 Million immediately, $5 Million next year, $5 Million in two years, and finally $20 Million to launch their product nationally in 3 years. Assume that VAI’s cost of capital is 45% and their estimated volatility is 60% per year. The risk-free rate is 5%.
4. What is the NPV of the opportunity to buy VAI, assuming you commit to make all of the proposed investments?
5. What is the NPV if you commit to the investments in years 0 (now), 1, and 2, but you retain the option to invest or not invest in year 3?
6. Finally, what is the NPV if your only commitment is the initial $2 million investment?

**The following questions focus on the case: Apex Investment Partners that is in your case packet on the Hub. Note: there is Apex (A) & Apex (B), the (B) case being the more important one.**

Part 1: Foundational Questions (10 points)

1. Is AccessLine an attractive investment opportunity for Apex? Why or Why not? What are the key risks associated with the investment?

We reckon AccessLine is an attractive investment opportunity for Apex. Because

1. How has AccessLine financed itself to date? Why have they chosen this strategy? Why is Dan Kranzler now considering raising funds from Apex?
2. How attractive are the terms that AccessLine has proposed for the B Series financing? How does the deal structure address the risks of the investment? What issues if any should concern Apex?

Part 2: Valuation Questions (60 points)

1. What is an appropriate valuation for AccessLine? Do analyses using the Venture Capital Method (target discount rate = 60%), the Comparable Companies Method, and the FCFF approach agree with each other? What do you think of Apex’s analysis? **(15 points)**
2. What does Bolander’s counter-offer look like? What is different about it? Does this raise still new questions once again? Does Bolander’s argument that the warrants he proposes adding to the Series B financing have minimal value have any merit? **(5 points)**
3. Morgan Stanley’s analysis was based on a Black-Scholes framework. How would you value the warrants using a binomial model? How does the warrant value change as the prospective date for an IPO changes (the firm could go public as early as 1997, this would make the warrants expire in 2002 rather than 2005)? In order to answer this, I would like you to construct binomial trees with annual timesteps to value the series B warrants with maturity between 7 and 10 years. To proceed, first take Bolander’s statement at face value, and assume the value of the warrants are incidental (i.e., take initial share price for the series B shares at $8/share and assess the value of 0.7 warrants with strike price X=$10/share. **(25 Points)**
4. The final agreement called for the terms of Bolander’s proposal except that Apex agreed to pay $16,600,000 for its 2,000,000 shares instead of $16,000,000. Does this make sense (i.e., are you able to get to a share price for the Series B that exceeds the value of the Series A)? Keep in mind that the Series A shares also attached warrants, so in fact the Series A investors did not actually pay $7 per share. **(15 points)**

**Note: Guidelines for warrant calculations on the next page, other hints follow those guidelines.**

**Coursework #3 Appendix**

**Guidelines for Calculation of Warrant Values**

The purpose of this section is to provide you with some guidance for working through the combined share and warrant valuation.

As part of the Apex case analysis you are asked to critique Mr. Bolander’s counter proposal and Morgan Stanley’s criticisms of it. The proposal on the table involves tacking warrants onto the shares of Accessline (AL) that Apex is considering investing in. AL’s original proposal asked Apex to pay $16,000,000 for 2 million shares of AL, i.e., $8 per share, while the Series A investors bought in at $7 per share. Apex is proposing to pay $16,000,000 for 2,000,000 shares PLUS 1,400,000 warrants with X = $10.00/shr **(Note: ignore the complications with the exercise price if the warrants are exercised within the next two years).**

Morgan Stanley values the warrants with the Black-Scholes model. In question (6), I ask you to value the warrants with a binomial model. Here is how you should proceed:

1. You are trying to value the combination of 1 share + 0.7 warrants and you want the total value of that package to equal $8. The case suggests that AL might go public in as soon as 2 years, meaning the warrants might expire in as soon as 7 years (or they may run as long as 10 years). I would like you to construct binomial trees anywhere from 7-10 periods (1 period = 1 year).
2. Since the proposal is for $8 per share and Bolander tries to argue that the warrant value is negligible (you of course know better!), set the initial stock price to $8. Then construct a tree based on the idea that:



1. Now value the warrant as a call option on AL shares with X=$10, T = 7, 8, 9, and 10.
2. Next you must account for the fact that each share comes with only 0.7 warrants and you must also account for the fact that these are warrants instead of calls and thus suffer from dilution. To account for the dilutive effects of the warrants, observe that prior to exercise of the warrants there are 15,229,982 shares of AL outstanding (assuming Apex buys the series B offering). Ignoring dilution, exercising the 1,400,000 warrants would net you a stake of 1.4/15.229982 = 9.19%. but in fact, because new shares are issued, your stake will only be 1.4/(15.229982 + 1.4) = 8.42%. Thus, to adjust for the dilution, multiply you call value by 8.42/9.19 = 0.9162 to account for the dilutive effects of the warrants.
3. Note that your goal is to find a share price where the sum of 1 share + 0.7 warrants has a total value of $8. Also, keep in mind that as you lower the share price the warrant value should drop and vice-versa. With this in mind, you ought to be able to find a share price such that the sum of 1 share plus 0.7 warrants equals $8 total.
4. As an additional part of question (6) consider the following: Morgan Stanley valued these warrants as having 10-year maturity and treated them as calls instead of warrants. Was this simply sloppy or did this work to their advantage to bolster their position as an advocate for AL in this negotiation?

**Hints and Other Information for the Apex Case**

1. Though the Apex assignment delves into several aspects of the proposed Accessline (AL) transaction, the valuation is by far the most important from our perspective. Don’t spend a lot of time on peripheral issues unless you are interested in exploring these topics in more detail (e.g., the specifics of the term sheets, etc.)
2. When working through the DCF, relative valuation, and venture capital method portion of the case, the following may be helpful:
3. Though there is a small amount of debt on AL’s balance sheet, you are welcome to assume that AL is 100% equity.
4. Since AL is a privately held company there is no market-based information from which to estimate cost of capital. In such instances, the norm is to use information from “comparable” companies. Both 3-COM and BT have data included in the appendix, but I suggest that you use only BT as a comparable. The 10-yr t-note rate is given in Exhibit 8 (use this for the risk-free rate), and assume a reasonable market risk premium (e.g., 7%).
5. Forecasts of AL’s financials over the next 5 years are given in Footnote #8. You can fill in any holes with linear interpolation.
6. When working out the warrant valuations, there is information on the volatility of AL in Footnote #3 of the “B” case. The Appendix of the case assignment details how to deal with the warrant valuation and the sum of the share and warrant.