ELLE INVESTMENTS INTERNSHIP QUESTIONNAIRE

Thank you for taking the time to complete this internship questionnaire. Please supply your responses directly below each question in this word document. **PLEASE PUT RESPONSES IN BOLD.** Send this completed questionnaire along with your resume to ellel@live.com. Programming applicants that do well on the questionnaire will be asked to do a simple coding exercise.

We are seeking **analyst** and **programming** interns to assist us.

The **analyst** intern will assist in evaluating companies and making investment decisions. After being assigned a group of stocks, each intern will be responsible for putting together presentations explaining company segments, key products, important movements in the stock price, pertinent balance sheet information, earnings estimates, etc. and coming up with an investment recommendation.

The analyst research will be presented and discussed during Skype calls which usually take place Monday, Wednesday, and Friday around 12:00pm EST. Occasionally the days or hours may change. It is understandable if you need to skip a call from time to time to study for an exam, attend a job interview, etc. We just ask that you let us know in advance so that the calls can be scheduled to include maximum participation. Please only apply if you can commit to at least 20 hours each week. As the internship runs year-round, you can always apply in the future if you think your current schedule will not allow substantial participation in both keeping up with your stock assignments and attending the Skype calls.

The **programming** intern will assist in the implementation and development of our database systems and software for strategy analysis, data acquisition, trading execution, and reporting.

[1] Basic Information

1. First name, last name, residential address

2. Email address and phone #

3. Highest level of formal education

4. List colleges/universities attended, areas of study, and degrees obtained

5. College grade point average (GPA) & grading system

6. **(Analysts Only)** Skills desired. List & explain your skills, coursework and experience with any of the following:

- Financial Statements (P&L, BS, Cash Flow)

- Business Valuation, DCF

- Stocks & Investing

- SEC filings

- Accounting rules and book- keeping

- Excel

7. **(Programmers Only)** Skills required. List & explain your familiarity and proficiency with the following tools:

- Complete familiarity with Windows and/or Mac OS;

- SQL

- Excel & VBA

- Object Oriented Programming (Java, C++, ..)

8. **(Programmers Only)** Skills desired. Any of the following would be useful:

- Web development HTML, PHP, CSS, etc.

- programming with .NET or .COM

- experience with APIs

- Internet and Network infrastructure

- understanding of some of the more popular cloud technologies

- UNIX and open-source projects

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[2] Programming Logic (**optional for analysts - but good for extra consideration**)

Consider the function below written in an unknown language. The questions below will refer to this function. Assume that this programming language has the following characteristics:

1. It uses zero based indexing of arrays (so 0 is the location of an array's first item).
2. The function size() is used to get the number of elements in an array.
3. Code crashes if you access an element of an array that doesn't exist.
4. In functions, it passes arrays by reference, not value.
5. Variable types do not need to be explicitly specified, but the variable ara is an array.

```
1  function cyk(ara):
2  i=0
3  s = ara[0]
4  while i < size(ara):
5  ara[i] = ara[i+1]
6  i=i+1
7  if size(ara) > 1: ara[size(ara)-1] = s
8  return ara
```

1. Which of the following statements best describes the purpose of the function cyk()?
a) It rearranges the order of the elements in ara.
b) It reverses the elements in ara.
c) If ara has n elements, it moves the element in position 0 to position n-1, the element in position 1 to position 0, the element in position 2 to position 1, etc.
d) If ara has n elements, it moves the element in position n-1 to position 0, the element in position n-2 to position n-1, the element in position n-3 to position n-2, etc.
e)If ara has n elements, it swaps the element in position 0 with the element in position n-1, swaps the element in position 1 with the element in position n-2, etc.

2. If this function cyk(), implemented as above, were applied to the array ara=[1,3,2,4], then:
a) The code would crash
b) It would return []
c) It would return [4,1,3,2]
d) It would return [3,2,4,1]
e) It would return [4,2,3,1]
f) It would return [2,3,1,4]

[3] Programming Logic (**programmers Only**)

Suppose there are about 500 records with a unique ID between 1-1000 (so there are gaps in the number sequence). We wish to renumber these records in sequence so that the IDs are as small as possible - with the caveat that some of the records are “locked” and their ID cannot be changed. Write pseudocode to do this task “efficiently”. (e.g. all records have even numbers 2, 4, . . . 1000. Records 100, 200, 300, etc. are locked. Renumber records to achieve this numbering: 1-494, 500, 600, 700, 800, 900, 1000)

[4] Logic

1. There are 4 shut doors in front of you. You know that each door has an animal painted on one side and a plant painted on the other side. The four doors have the following painted on the sides that you can see (one per door): a lily, a pine tree, a fox, and an eagle. You have been told that these doors satisfy the rule "if a door has a flower on its plant side, then it has a bird on its animal side". Which is the smallest set of doors that you must check the hidden side of to determine conclusively whether this rule is true or false for these doors?

2. Suppose that in a group of people you find that X percent of people in the group have heights that are greater than the average (that is, the mean) height in that group. Which of the following is a true statement about X?

a) X can be any percentage.
b) X cannot be bigger than 25%.
c) X can be bigger than 25% but cannot be bigger than 50%.
d) X can be bigger than 50% but cannot be as high as 99.9%.
e) X can be bigger than 99.9% but cannot be equal to 100%.

3. Suppose that you are at a casino playing roulette. The strategy you are using is to, before each bet, flip a coin to determine whether to place your bet on red or on black (which, according to the rules of the game, should each have almost a 50% chance of occurring). After you've placed each bet, the roulette wheel is then spun. Suppose that you lose 59 times in a row (i.e. for 59 consecutive plays, when you place your bet on black the ball then lands on red, and when you place your bet on red the ball then lands on black). From this experience, it is most rational to conclude that:

a) Using a coin toss to determine whether to bet on red or black is in general a very bad strategy for playing roulette
b) The game is somehow rigged against you and the casino or its employees are cheating you
c) You are very likely to win on your next bet if you continue this coin flip based strategy
d) The roulette game is broken, but there is no reason to assume that it was broken intentionally
e) You were merely very unlucky
f) One cannot reasonably conclude which of the above options is more likely

4. Suppose that you have an enormous grapefruit that is 92% water (by weight). The grapefruit weights 100 pounds. If the water content of the grapefruit evaporates until it is 90% water (by weight), then approximately how much does the grapefruit now weigh?

a) 92 pounds
b) 90 pounds
c) 82pounds
d) 80 pounds
e) 72 pounds
f) 70 pounds

[5] Risk

Consider a purely probabilistic game that you have the opportunity to play. Each time you play there are n potential known outcomes x1, x2, ..., xn (each of which is a specified gain or loss of dollars according to whether xi is positive or negative).

These outcomes x1, x2, ..., xn occur with the known probabilities p1, p2, ..., pn respectively (where p1 + p2 + ... + pn = 1.0 and 0 <= pi <= 1 for each i).

Furthermore, assume that each play of the game takes up one hour of your time, and that only you can play the game (you can't hire someone to play for you).

Let E be the game's expected value and S be the game's standard deviation.

1. In the real world, should a rational player always play this game whenever the expected value E is not negative? Why or why not?

2. Does the standard deviation S do a good job of capturing how risky this game is? Why or why not?

3. If YOU PERSONALLY had to decide whether or not to play this game, how would you decide?

[6] Quick Business Analysis (**Analysts Only**)

For the following two companies, how much cash do they have on hand? Will they need to raise cash in the next year and if so when and how much? The analysis need not be thorough or complete – just get the data and explain what you would look at. ATHX, ACRX

[7] Other

1. Suggest a question that might be added to this questionnaire that would be helpful in evaluating candidates (either analysts, programmers, or both) and explain why. Also supply the correct answer and if this is a multiple-choice question, a list of possible answers.

2. If you feel that any of the questions in this questionnaire are unreasonable, ambiguous or poorly worded, please tell us which ones. We appreciate your feedback, but this is entirely optional.

Ps. If you choose to type into this document, make sure that your answers wrap.