**Assignment-6**

**(Full marks = 100)**

This two week project has two parts: (1) back-up strategy for you final project, and (2) detailed outline of your final project.  Both parts are due Tuesday 4/18 at midnight. Post your back-up strategy and outline in one document to your team discussion board.  
  
\*\* YOU NEED TO POST BOTH PARTS TO GET CREDIT FOR THIS ASSIGNMENT \*\*  
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Part 1: Backing up your data.  
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People very often lose data from a disk failure, stolen laptop, lost USB, or a virus.  And if you model the probabilities, it's extremely likely that at least one Bio-360 student will lose data before the end of this semester.  If the student routinely backed-up his/her data, then little is lost. However, if he/she didn’t perform backups, then all is lost. Don’t let that be you!

For homework, read the article on Blackboard: "Washington Post Thumb USB drive backup story."  
  
If you have any lost data nightmare stories, post them to your Blackboard group.  Here are two stories to get you thinking:

1) In the Wheatley building, I saw a $500 reward posted for a stolen laptop.  The owner's wedding photos are on the laptop, and there are NO BACKUPS.  Whoops!  Imagine explaining *that* to your spouse!

2) I know a situation where someone lost all of his kid's childhood pictures on a crashed hard drive with NO BACKUPS.  Whooops!!  Imagine explaining *that* to your spouse!!

Design a plan to back-up your bioinformatics data, and post to your group how you will back-up your important data.   Explain how you'll avoid the nightmare in that Washington Post story.    
  
Be sure to answer these questions: [Each question carry 5 points]

a) How will you backup your data?  (USB, online/cloud storage, etc.)  
  
b) How often will you backup your data?   
  
c) Where (physically) will you store your backup data?  
  
d) If there is a catastrophe like a flood or fire, will your backup be in a different place?  
  
e) How would you recover your lost data?

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PART 2: Outline.   
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Before doing anything, read the final project info FinalPaperInstructions.pdf.    
  
1) Read the Blackboard file "Really Good Outline."  That's an A grade, and it's exactly what you want to replicate here.

2) Everyone in your team must pick a gene from the following list of 12 genes. No two students on the same team can have the same gene and it’s first-come first-serve. Claim your gene by posting to your team discussion board. (All the genes are equally good and interesting.) You may choose from the following human genes: [Selection of gene carry 5 points]

1. HFE
2. ACVR1
3. CFTR
4. POLG
5. RASA1
6. TNFR1
7. MECP2
8. FADD
9. CXCR3
10. LMNA
11. SIRT2
12. CUL3

3) For your gene, write a similar indented outline to show the structure of your project.  This outline will become the structure of your final paper, so give it some careful thought.  Remember, this is just an outline, it's not even a draft! Be sure to capture the structure of all the main points.

For the outline, here are some of the key topics we've covered.   You need to include all of these in your outline:   
  
- Biological introduction to your gene [5 points]  
  
- Literature survey of your gene (especially review papers in PubMed, OMIM) [5 points]  
  
- Likely orthologs and paralogs from your BLAST analysis.  Be sure to include both distant and similar sequences. You should use the longest isoform (which is usually isoform 1) for all your analysis. [7 points]  
  
- Multiple sequence analysis of your gene family, including a discussion of conserved and non-conserved regions. [5 points]  
  
- Conserved domain analysis from CDD and SMART. [3+3 = 6 points]  
  
- Existence of crystal structure of your protein? [5 points]  
  
- Predicted second structure of the protein. [6 points]  
  
- Homology model of your protein. [7 points]  
- Differential gene expression of your gene. [7 points]  
  
- Protein-protein interactions with your gene. [7 points]  
  
Finally, and **very importantly**, sketch how your bioinformatic analysis supports and meshes with the literature survey.  Remember, this is the whole goal of the course: To use bioinformatics to learn more about biology. [6 points]  
  
Include your references in the outline. [4 points]