

CAP5510 Introduction to Bioinformatics

Fall 2009

Homework #1

(Assigned Sept.2. Due: Sept.9, 2009)

(Submit Answers for only 3 questions but prepare the answers to all 6 questions before midterm and final exams)

1. What is the difference between a DNA and RNA? What is a codon? Describe briefly the process by which protein is manufactured within an eukaryotic cell. Explain, using your own words, the central dogma of molecular Biology.
3. Describe the basic principles underlying the Sanger's chain termination method of sequencing a short DNA segment.
4. Describe the basic principles of PCR (Polymerase Chain Reaction). Why PCR is considered to be a significant laboratory technique in bio-molecular science?
5. What is a microarray? Describe how microarray can be used to perform the following tasks: 1) sequence a DNA string, 2) determine the gene expressions level.
6. Explain the following: Double helix structure of DNA, Genetic Code, Triplet nature of genetic code, mRNA, tRNA, Ribosomal RNA, Mitosis, Meiosis, Chromosome, Genome, Transcription, Translation, codon, DNA replication, Protein.

Reading Assignment

1. Chapters 1,2 and 3 of "Introduction to Bioinformatics" by Jones and Pevzner
2. "A Handout on Mapping and Sequencing" (posted in course website)
3. "An Article on DNA Sequencing" (posted in course website)
4. "An Article on Microarray" (posted in course website)