

Bioinformatics Midterm Prep Questions

Which of the following is true regarding genome rearrangements?

- A. They occur frequently in evolution.
- B. They are often responsible for erecting species barriers.
- C. They can trigger speciation events.
- D. Closely related organisms show fewer genome arrangements than more distantly related organisms
- E. All of the above.

True/False In BLAST searches using only a single genome as target, proteins have more than one match because of paralogs.

What is GC strand bias (based on location with respect to the origin and terminus of replication)?

- A. There are more GC dinucleotide simple repeats near the origin.
- B. The G versus C content of the leading strand versus lagging strand changes.
- C. The CG versus AT content of a genome changes.
- D. The GC versus AT content of the leading strand versus lagging strand changes.
- E. None of the above.

Which of the following is NOT an advantage of performing BLAST on the command line?

- A. It is easy to BLAST an entire genome against another entire genome
- B. The same script to perform command line BLAST searches can be reused anytime one wants to add a BLAST step to a pipeline.
- C. It is simple enough for anyone, even people with no computer skills, to point and click their way to results.
- D. It is possible to write a script to run 100,000 BLAST searches in one go
- E. Scripted BLAST searches can be put into a pipeline with other computer scripts, to perform a complex task for you, leaving one free to do other things

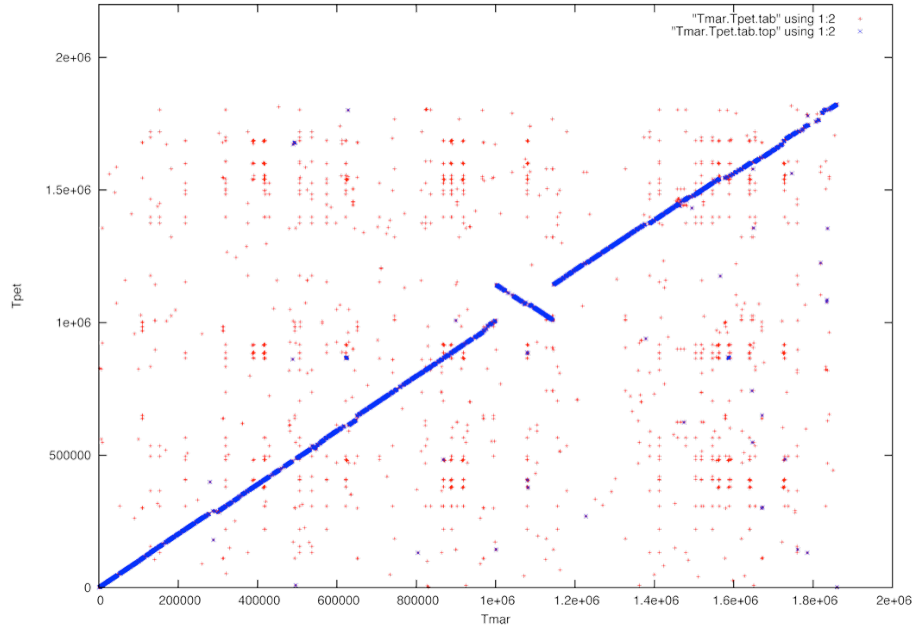
In the unix operating system, which command would one use to check which files are in the current directory?

- A. ls
- B. cat
- C. pwd
- D. cd
- E. qlogin

In the unix operating system, which command would one use to enter a subdirectory?

- A. ls
- B. chmod
- C. pwd
- D. cd
- W. qlogin

For Questions 21 through 24, refer to the following graph



What mechanism is this graph depicting when blue dots appear on the downward sloping diagonal?

- A. Translocation
- B. Deletion or Insertion
- C. Neofunctionalization
- D. Inversion**
- E. All of the above

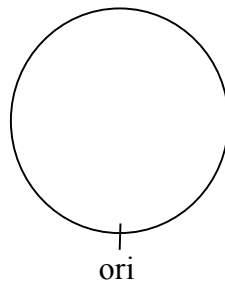
What mechanism is this graph depicting when there is a gap in the blue line, with the blue line picking up a notch higher or lower on the y-axis after the gap?

- A. Translocation
- B. Deletion or Insertion**
- C. Neofunctionalization
- D. Inversion
- E. All of the above

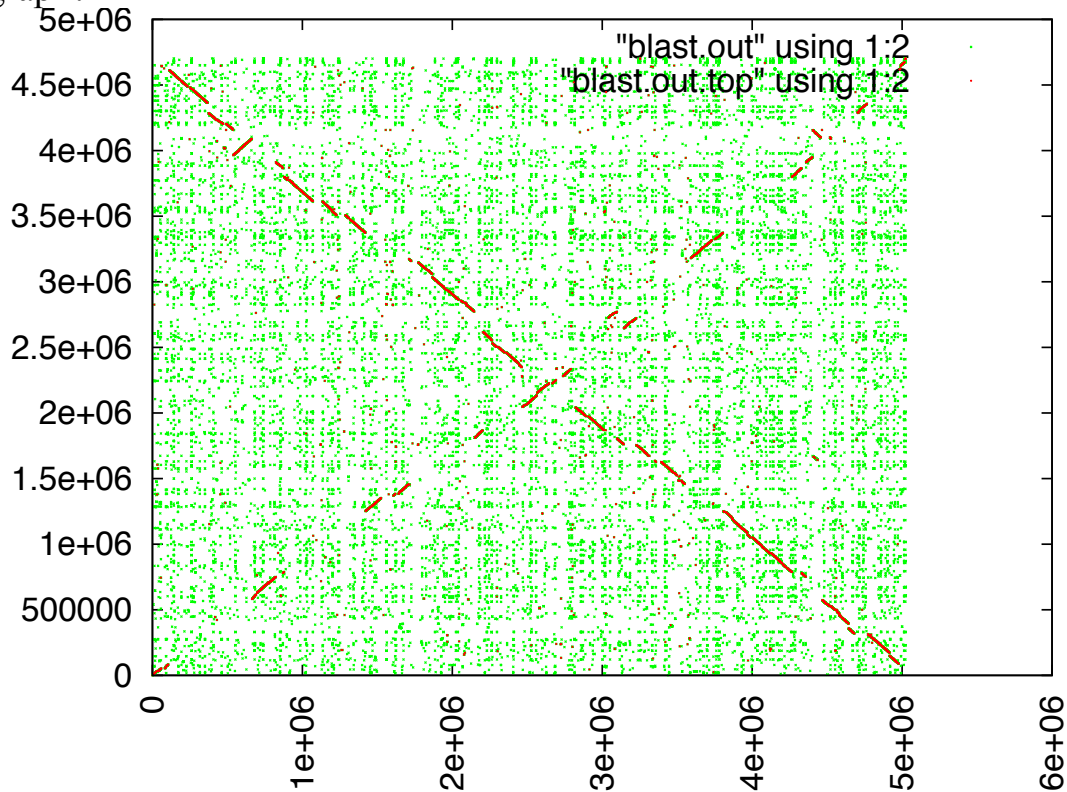
After plotting the blast hits from the two genomes, what does the blue line represent?

- A. The location of all genes in one genome versus the location of ALL the blast hits in the other genome
- B. The location of all genes in one genome versus the location of the top scoring blast hit in the other genome**
- C. The location of the gene in the environment
- D. A and B
- E. None of the above

Map the genome rearrangement shown onto the circular genome below:



How many genome rearrangement events are needed to produce the following graph?



- A. 1 B. 2 C. 3 D. 4 E. 5 **F. 6 or more**

Selection for function can preserve sequence similarity in the pairwise comparison of homologous proteins, across domains separated by how many years of independent evolution?

- A. Thousands
B. Millions
C. Billions
D. Limited only by how long life has existed
E. All of the above

