Bioinformatics (Akiyama) Exercise #10

Student ID Name

1) Edit distance

Suppose that five genes on human (ヒト) chromosome and mouse (マウス) chromosome are homologous but their order is shuffled as shown below.

Answer the minimum number of operations required to change the mouse order to the human order, or vice versa.

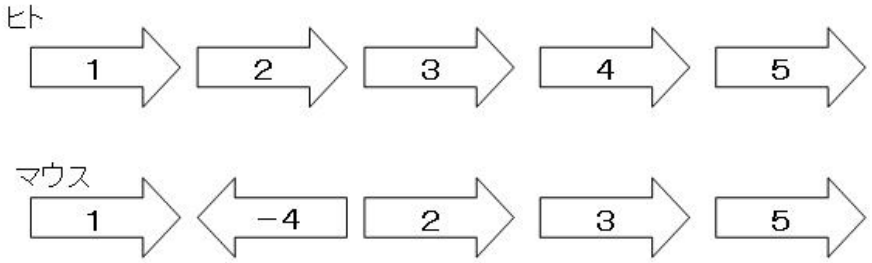

Fig. Order of five genes on human (upper) and mouse (lower) chromosome

(a) Show the graph representation of human and mouse gene order.

Mouse: Reality graph (Solid lines) outer

Human: Desired graph (Dotted lines) inner

Ans.

(b) Answer the number of independent alternative cycles (=C)

Ans.

(c) Answer the expected minimum number for inversion operations.
It is given by $X = N + 1 - C$, and gene number $N = 5$ in this case.

Ans.

(d) Show the series of edit (inversion) operations.
Start from the mouse gene order, and change it to the human order,
with minimum number of inversion operations.

Ans.