COS126 Prep for Sequence Alignment Assignment

- Group Activity: Calling non-static methods, Edit distance, Recovering the alignment, static constants.

1. Calling non-static methods. Non-static methods will be associated with a data type. Call them using a variable name declared as that data type.

   What does the following code fragment print? (p. 339)

   ```java
   String a = "now is ";
   Stdout.println(a.length());
   Stdout.println(a.charAt(4));
   ```

2. Manually computing the edit distance from 2 aligned strings.

   ```
   A A C A G T T A C C
   T A A G G T C A - -
   1 0 1
   edit distance:
   ```

3. Manually computing the edit distance from 2 strings.

   Suppose you have two matching characters. x = "A", y = "A" The bottom row and rightmost column are your "base cases." The bottom row represents no more x characters. The rightmost column represents no more y characters.

   ```
   x\y A -
   A
   -
   ```

   Suppose you have a mismatch in the last two characters. x = "A", y = "C".

   ```
   x\y C -
   A
   -
   ```
Fill in the matrix for the strings: \(x = "ATAG", y = "TAC"\)

\[
\begin{array}{cccc}
  & T & A & C & - \\
A & 8 & & & \\
T & 6 & & & \\
A & 4 & & & \\
G & 5 & 3 & 1 & 2 \\
- & 6 & 4 & 2 & 0
\end{array}
\]

4. Recover the alignment for \(x = "ATAG", y = "TAC"\), using the completed matrix from the previous part.

\[
x \quad y \quad \text{penalty}
\]

5. Recover the alignment for \(x = "bb", y = "bbb"\) using the following matrix.

\[
\begin{array}{cccc}
  & b & b & b & - \\
b & 2 & 0 & 2 & 4 \\
b & 4 & 2 & 0 & 2 \\
- & 6 & 4 & 2 & 0
\end{array}
\]

6. Static constants are constants which are declared and initialized inside the class block, but outside any methods. These constants are then available to any method in the class, including \texttt{main()}. To make your code easier to read, and to avoid hardwiring constants, declare the three penalty values as static constants.

\[
\text{public class EditDistance} \\
\quad \text{private static final int GAP = 2;}
\]

Recommended Book exercises for analysis: 4.1.10, 4.1.18, 4.1.20, 4.1.27