**ECS129**

**Examples of Sequence Alignments Using Dynamic Programming**

In all the example below:

* Fill in the matrix
* Write one of the alignments with optimal score

**Example 1:**

***Match: +2; Mismatch 0; Gap 0***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **G** | **A** | **T** | **T** | **A** | **G** | **C** |
| **A** |  |  |  |  |  |  |  |
| **T** |  |  |  |  |  |  |  |
| **T** |  |  |  |  |  |  |  |
| **A** |  |  |  |  |  |  |  |
| **C** |  |  |  |  |  |  |  |

**Example 2:**

***Match: +2; Mismatch 0; Gap -2 (no gap cost at the beginning)***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | G | A | T | T | A | G | C |
| A |  |  |  |  |  |  |  |
| T |  |  |  |  |  |  |  |
| T |  |  |  |  |  |  |  |
| A |  |  |  |  |  |  |  |
| C |  |  |  |  |  |  |  |

**Example 3**

***Match: +1; Mismatch: 0; Gap: -1 (no gap cost at the beginning)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | I | N | D | U | S | T | R | Y |
| I |  |  |  |  |  |  |  |  |
| N |  |  |  |  |  |  |  |  |
| T |  |  |  |  |  |  |  |  |
| E |  |  |  |  |  |  |  |  |
| R |  |  |  |  |  |  |  |  |
| E |  |  |  |  |  |  |  |  |
| S |  |  |  |  |  |  |  |  |
| T |  |  |  |  |  |  |  |  |

**Example 4**

***Match: +10; Mismatch: -5; Gap: -5 (no gap cost at the beginning)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | I | N | D | U | S | T | R | Y |
| I |  |  |  |  |  |  |  |  |
| N |  |  |  |  |  |  |  |  |
| T |  |  |  |  |  |  |  |  |
| E |  |  |  |  |  |  |  |  |
| R |  |  |  |  |  |  |  |  |
| E |  |  |  |  |  |  |  |  |
| S |  |  |  |  |  |  |  |  |
| T |  |  |  |  |  |  |  |  |

**Example 5:**

***Match: +10; Mismatch: +3; Gap: -8 (no gap cost at the beginning)***

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | G | S | A | Q | V | K | G | H | H | K | K | V |
| G |  |  |  |  |  |  |  |  |  |  |  |  |
| N |  |  |  |  |  |  |  |  |  |  |  |  |
| P |  |  |  |  |  |  |  |  |  |  |  |  |
| K |  |  |  |  |  |  |  |  |  |  |  |  |
| V |  |  |  |  |  |  |  |  |  |  |  |  |
| K |  |  |  |  |  |  |  |  |  |  |  |  |
| A |  |  |  |  |  |  |  |  |  |  |  |  |
| H |  |  |  |  |  |  |  |  |  |  |  |  |
| G |  |  |  |  |  |  |  |  |  |  |  |  |
| K |  |  |  |  |  |  |  |  |  |  |  |  |
| K |  |  |  |  |  |  |  |  |  |  |  |  |
| V |  |  |  |  |  |  |  |  |  |  |  |  |