Gotoh & WSB, SoP Unit Tests

Hint: Many test values are taken from project Algorithms
for Bioninformatics of Alexander Mattheis or the lectures.

Test 1

Input

Sequence A: GG
Sequence B: TGGA

Gap Opening: -3
Enlargement: -1
Match: 0
Mismatch: -1

$g(k) = -3 - k \cdot 1$

Output

		T	G	G	A
	-	-∞	-∞	-∞	-∞
G	-	-8	-9	-10	-11
G	-	-5	-8	-9	-11

		T	G	G	A
	0	-4	-5	-6	-7
G	-4	-1	-4	-5	-7
G	-5	-5	-1	-4	-6

		T	G	G	A
	-	-	-	-	-
G	-∞	-8	-5	-6	-7
G	-∞	-9	-9	-5	-6

```
Seq1    __GG
          *|
Seq2    TGGA
```

		T	G	G	A
	-	-∞	-∞	-∞	-∞
G	-	-8	-9	-10	-11
G	-	-5	-8	-9	-11

		T	G	G	A
	0	-4	-5	-6	-7
G	-4	-1	-4	-5	-7
G	-5	-5	-1	-4	-6

		T	G	G	A
	-	-	-	-	-
G	-∞	-8	-5	-6	-7
G	-∞	-9	-9	-5	-6

```
Seq1    GG__
        |*
Seq2    TGGA
```

Test 2

Input

```
Sequence A:       CG
Sequence B:       CCGA

Gap Opening:      -3          g(k) = -3 - k·1
Enlargement:      -1
Match:             1
Mismatch:         -1
```

Output

		C	C	G	A
	-	-∞	-∞	-∞	-∞
C	-	-8	-9	-10	-11
G	-	-3	-7	-8	-9

		C	C	G	A
	0	-4	-5	-6	-7
C	-4	1	-3	-4	-5
G	-5	-3	0	-2	-5

		C	C	G	A
	-	-	-	-	-
C	-∞	-8	-3	-4	-5
G	-∞	-9	-7	-4	-5

```
Seq1    C__G
        *  |
Seq2    CCGA
```

		C	C	G	A
	-	-∞	-∞	-∞	-∞
C	-	-8	-9	-10	-11
G	-	-3	-7	-8	-9

		C	C	G	A
	0	-4	-5	-6	-7
C	-4	1	-3	-4	-5
G	-5	-3	0	-2	-5

		C	C	G	A
	-	-	-	-	-
C	-∞	-8	-3	-4	-5
G	-∞	-9	-7	-4	-5

```
Seq1    CG__
        *|
Seq2    CCGA
```

Test 3

Input

```
Sequence A:        TCCGA
Sequence B:        TACGCAGA

Gap Opening:       -4          g(k) = -4 - k·1
Enlargement:       -1
Match:              1
Mismatch:           0
```

Output

		T	A	C	G	C	A	G	A
	-	-∞	-∞	-∞	-∞	-∞	-∞	-∞	-∞
T	-	-10	-11	-12	-13	-14	-15	-16	-17
C	-	-4	-9	-10	-11	-12	-13	-14	-15
C	-	-5	-4	-8	-10	-10	-12	-13	-14
G	-	-6	-5	-3	-8	-9	-10	-11	-12
A	-	-7	-6	-4	-2	-7	-8	-9	-10

		T	A	C	G	C	A	G	A
	0	-5	-6	-7	-8	-9	-10	-11	-12
T	-5	1	-4	-5	-6	-7	-8	-9	-10
C	-6	-4	1	-3	-5	-5	-7	-8	-9
C	-7	-5	-4	2	-3	-4	-5	-6	-7
G	-8	-6	-5	-3	3	-2	-3	-4	-5
A	-9	-7	-5	-4	-2	3	-1	-3	-3

		T	A	C	G	C	A	G	A
	-	-	-	-	-	-	-	-	-
T	-∞	-10	-4	-5	-6	-7	-8	-9	-10
C	-∞	-11	-9	-4	-5	-6	-7	-8	-9
C	-∞	-12	-10	-9	-3	-4	-5	-6	-7
G	-∞	-13	-11	-10	-8	-2	-3	-4	-5
A	-∞	-14	-12	-10	-9	-7	-2	-3	-4

```
Seq1    TCC___GA
        *|*   **
Seq2    TACGCAGA
```

		T	A	C	G	C	A	G	A
	-	-∞	-∞	-∞	-∞	-∞	-∞	-∞	-∞
T	-	-10	-11	-12	-13	-14	-15	-16	-17
C	-	-4	-9	-10	-11	-12	-13	-14	-15
C	-	-5	-4	-8	-10	-10	-12	-13	-14
G	-	-6	-5	-3	-8	-9	-10	-11	-12
A	-	-7	-6	-4	-2	-7	-8	-9	-10

		T	A	C	G	C	A	G	A
	0	-5	-6	-7	-8	-9	-10	-11	-12
T	-5	1	-4	-5	-6	-7	-8	-9	-10
C	-6	-4	1	-3	-5	-5	-7	-8	-9
C	-7	-5	-4	2	-3	-4	-5	-6	-7
G	-8	-6	-5	-3	3	-2	-3	-4	-5
A	-9	-7	-5	-4	-2	3	-1	-3	-3

		T	A	C	G	C	A	G	A
	-	-	-	-	-	-	-	-	-
T	-∞	-10	-4	-5	-6	-7	-8	-9	-10
C	-∞	-11	-9	-4	-5	-6	-7	-8	-9
C	-∞	-12	-10	-9	-3	-4	-5	-6	-7
G	-∞	-13	-11	-10	-8	-2	-3	-4	-5
A	-∞	-14	-12	-10	-9	-7	-2	-3	-4

```
Seq1    T___CCGA
        *   *|**
Seq2    TACGCAGA
```

		T	A	C	G	C	A	G	A
	-	-∞	-∞	-∞	-∞	-∞	-∞	-∞	-∞
T	-	-10	-11	-12	-13	-14	-15	-16	-17
C	-	-4	-9	-10	-11	-12	-13	-14	-15
C	-	-5	-4	-8	-10	-10	-12	-13	-14
G	-	-6	-5	-3	-8	-9	-10	-11	-12
A	-	-7	-6	-4	-2	-7	-8	-9	-10

		T	A	C	G	C	A	G	A
	0	-5	-6	-7	-8	-9	-10	-11	-12
T	-5	1	-4	-5	-6	-7	-8	-9	-10
C	-6	-4	1	-3	-5	-5	-7	-8	-9
C	-7	-5	-4	2	-3	-4	-5	-6	-7
G	-8	-6	-5	-3	3	-2	-3	-4	-5
A	-9	-7	-5	-4	-2	3	-1	-3	-3

		T	A	C	G	C	A	G	A
	-	-	-	-	-	-	-	-	-
T	-∞	-10	-4	-5	-6	-7	-8	-9	-10
C	-∞	-11	-9	-4	-5	-6	-7	-8	-9
C	-∞	-12	-10	-9	-3	-4	-5	-6	-7
G	-∞	-13	-11	-10	-8	-2	-3	-4	-5
A	-∞	-14	-12	-10	-9	-7	-2	-3	-4

```
Seq1    TCCG___A
        *|**   *
Seq2    TACGCAGA
```

Test 4

Input

```
Sequence A:       CC
Sequence B:       ACCT

Gap Opening:      -4          g(k) = -4 - k·1
Enlargement:      -1
Match:             0
Mismatch:         -1
```

Output

		A	C	C	T
	-	-∞	-∞	-∞	-∞
C	-	-10	-11	-12	-13
C	-	-6	-10	-11	-13

		A	C	C	T
	0	-5	-6	-7	-8
C	-5	-1	-5	-6	-8
C	-6	-6	-1	-5	-7

		A	C	C	T
		-	-	-	-
C	-∞	-10	-6	-7	-8
C	-∞	-11	-11	-6	-7

```
Seq1    __CC
          *|
Seq2    ACCT
```

		A	C	C	T
	-	-∞	-∞	-∞	-∞
C	-	-10	-11	-12	-13
C	-	-6	-10	-11	-13

		A	C	C	T
	0	-5	-6	-7	-8
C	-5	-1	-5	-6	-8
C	-6	-6	-1	-5	-7

		A	C	C	T
		-	-	-	-
C	-∞	-10	-6	-7	-8
C	-∞	-11	-11	-6	-7

```
Seq1    CC__
        |*
Seq2    ACCT
```

Test 5-8: Needleman-Wunsch-Tests-Simulation by setting gap opening to 0.