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

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

Match: 0
Mismatch: -1

Output

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

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

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

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

		T G		G	Α
	0	-4	-5	-6	-7
G	-4	-1	-4	-5	-7
G	-5	-5	-1	-4	-6
			7		
			1		
		T	G	G	Α
	-	T -	G -	G \ -	A -
G	- -∞	T - -8	G -	G - -6	A 7

Test 2

Input

Sequence A: CG Sequence B: CCGA

Gap Opening: -3 $g(k) = -3 - k \cdot 1$

Enlargement: -1
Match: 1
Mismatch: -1

Output

		С	С	G	Α	
	-	-∞	-∞	-∞	-∞	
С	-	-8	-9	-10	-11	
G	-	-3	-7	-8	-9	

		С	С	G	Α
	0	-4	-5	-6	-7
С	-4	1	-3	-4,	-5
G	-5	-3	0	-2	-5
		/			
		C	С	G	Α
	-	- -	C -	G -	A
С	- -∞	- -8	-3	G - -4▼	A - -5

		С	С	G	Α
	-	-∞	-∞	-∞	-∞
С	-	-8	-9	-10	-11
G	-	-3	-7	-8	-9

		С	С	G	Α
	0	-4	-5	-6	-7
С	-4	1	-3	-4	-5
G	-5	-3	0	-2	-5 ₁
			7		
		С	c	G	Α
	-	-	-	-	-
С	-∞	-8	-3	-4	-5
G	-∞	-9	-7	١-4	-5

Seq1 CG__ *| Seq2 CCGA

Test 3

Input

Sequence A: TCCGA Sequence B: TACGCAGA

Gap Opening: -4 $g(k) = -4 - k\cdot 1$ Enlargement: -1

Enlargement: -1
Match: 1
Mismatch: 0

Output

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

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

		T	Α	С	G	С	Α	G	Α
	-	-	-	-	-	-	-	-	-
T	-∞	-10	-4	-5	-6	-7	-8	-9	-10
С	-∞	-11	-9	-4	-5	-6	-7	-8	-9
С	-∞	-12	-10	-9	' -3	-4	-5	-6	-7
G	-∞	-13	-11	-10	-8	-2	-3	-4	-5
Α	-∞	-14	-12	-10	-9	-7	-2	-3	-4

Seq1 TCC___GA *|* ** Seq2 TACGCAGA

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

		Т	Α	С	G	С	Α	G	Α
	0	-5	-6	-7	-8	-9	-10	-11	-12
Т	-5	1 🛦	-4	-5	-6 ₁	-7	-8	-9	-10
С	-6	-4	1	-3	-5	-5	-7	-8	-9
С	-7	-5	-4	2	-3	-4	-5	-6	-7
G	-8	-6	-5	-3	3	-2	-3	-4	-5
Α	-9	-7	-5	-4	-2	3	-1	-3	-3
		T	Α	С	G	С	Α	G	Α
	-	-	-	-	-	-	-	-	-
Т	-∞	-10	٠-4	-5	-6♥	-7	-8	-9	-10
С	-∞	-11	-9	-4	-5	-6	-7	-8	-9
С	-∞	-12	-10	-9	-3	-4	-5	-6	-7
G	-∞	-13	-11	-10	-8	-2	-3	-4	-5

T___CCGA * *|** Seq1 Seq2 TACGCAGA

		T	Α	С	G	С	Α	G	Α
	-	-∞	-∞	-∞	-∞	-∞	-∞	-∞	-∞
T	-	-10	-11	-12	-13	-14	-15	-16	-17
С	-	-4	-9	-10	-11	-12	-13	-14	-15
С	-	-5	-4	-8	-10	-10	-12	-13	-14
G	-	-6	-5	-3	-8	-9	-10	-11	-12
Α	-	-7	-6	-4	-2	-7	-8	-9	-10
		Т	Α	С	G	С	Α	G	Α
	0	_	_		_	_	10	4.4	4.2

		ı	Α	C	G	C	Α	G	Α
	0	-5	-6	-7	-8	-9	-10	-11	-12
T	-5	1	-4	-5	-6	-7	-8	-9	-10
С	-6	-4	1	-3	-5	-5	-7	-8	-9
С	-7	-5	-4	2	-3	-4	-5	-6	-7
G	-8	-6	-5	-3	3	-2	-3	-4	-5
Α	-9	-7	-5	-4	-2	3	-1	-3	-3
					1				
					1				
		T	Α	С	G	С	Α	G	Α
	-	T -	A	C -	G -	C	A	G -	A
T	- -∞					C - -7			- -10
T C	_	-	-	-	-	-	-	-	-
	-∞	-10	- -4	- -5	- -6	- -7	- -8	- -9	- -10
С	-∞ -∞	- -10 -11	- -4 -9	- -5 -4	- -6 -5	- -7 -6	- -8 -7	- -9 -8	- -10 -9

TCCG___A *|** * Seq1 TACGCAGA Seq2

Test 4

Input

Sequence A: CC Sequence B: ACCT

Gap Opening: -4

Enlargement: -1

Match: 0
Mismatch: -1

Output

		Α	С	С	T
	-	-∞	-∞	-∞	-∞
С	-	-10	-11	-12	-13
С	-	-6	-10	-11	-13

		Α	С	С	Т
	0	-5	-6	-7	-8
С	-5	-1	-5	-6	-8
С	-6	-6	-1	-5	-7

		Α	С	С	T
		-	-	-	-
С	-∞	-10	-6	-7	-8
С	-∞	-11	-11	-6	-7

Seq2 ACCT

		Α	С	С	T
	-	-∞	-∞	-∞	-∞
С	-	-10	-11	-12	-13
С	-	-6	-10	-11	-13

		Α	С	С	T
	0	-5	-6	-7	-8
С	-5	-1	-5	-6	-8
С	-6	-6	-1	-5	-7 ₁
			1		
			1		
		Α	С	С	Т
		A	c -	C -	T -
С	-∞	A - -10	c - -6	C -	T - -8

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

 $g(k) = -4 - k \cdot 1$