C G 4 ×4×4
4×C G 4 ×4
= 4 C G 4
4. ×4×C G

Q2.

a) {A, C, G, T}

All possible combinations:

A C G = 0.1 × 0.2 × 0.2 = 0.004
C C G = 0.2 × 0.2 × 0.2 = 0.008
G C G = 0.2 × 0.2 × 0.2 = 0.008
T C G = 0.5 × 0.2 × 0.2 = 0.02
C G A = 0.2 × 0.2 × 0.1 = 0.004
C G C = 0.2 × 0.2 × 0.2 = 0.008
C G G = 0.2 × 0.2 × 0.2 = 0.008
C G T = 0.2 × 0.2 × 0.5 = 0.02

Total Prob = 0.08

b) All possible combinations:

C G 4 4 4 = 64
4 C G 4 4 = 64
4 4 C G 4 = 64
4 4 4 C G = 64
} 256 ways

There are C, G

C G 2 2 2 × 4 ways that prob would be 0.2 × 0.2 × 0.2 × 0.2 × 0.2
= 0.00032.

0.00032 × 4 × 8 = 0.00128 × 8 = 0.01024.

For all A on empty: 4 × (0.2 × 0.2 × 0.1 × 0.1 × 0.1) = 0.00016

For all T on empty: 4 × (0.2 × 0.2 × 0.5 × 0.5 × 0.5) = 0.02

For 1A 2T : 4 × (0.2 × 0.2 × 0.1 × 0.5 × 0.5) × 3 = 0.012.

for 1T 2A : 4 × (0.2 × 0.2 × 0.1 × 0.1 × 0.5) × 3 = 0.0024

for 1A 1T 1C : 4 × (0.2 × 0.1 × 0.5 × 0.2 × 0.2) × 6 = 0.0096

For 2A 1C : 4 × (0.2 × 0.2 × 0.1 × 0.1 × 0.2) × 3 = 0.00096

For 2A 1G $4 \times (0.2 \times 0.2 \times 0.1 \times 0.1 \times 0.2) \times 3 = 0.00096$

For 1A 1T 1G $4 \times (0.2 \times 0.2 \times 0.1 \times 0.5 \times 0.2) \times 6 = 0.0096$

For 2T 1C $4 \times (0.2 \times 0.2 \times 0.5 \times 0.5 \times 0.2) \times 3 = 0.024$

For 2T 1G $4 \times (0.2 \times 0.2 \times 0.5 \times 0.5 \times 0.2) \times 3 = 0.024$

For 1A 2C $4 \times (0.2 \times 0.2 \times 0.1 \times 0.2 \times 0.2) \times 3 = 0.00192$

For 1A 2G $4 \times (0.2 \times 0.2 \times 0.1 \times 0.2 \times 0.2) \times 3 = 0.00192$

For 1T 2C $4 \times (0.2 \times 0.2 \times 0.5 \times 0.2 \times 0.2) \times 3 = 0.0096$

For 1T 2G $4 \times (0.2 \times 0.2 \times 0.5 \times 0.2 \times 0.2) \times 3 = 0.0096$

For 1C 1A 1G $4 \times (0.2 \times 0.2 \times 0.2 \times 0.1 \times 0.2) \times 6 = 0.00384$

For 1C 1A 1T $4 \times (0.2 \times 0.2 \times 0.2 \times 0.1 \times 0.5) \times 6 = 0.0096$

Total possibility: 0.18496

L

AG

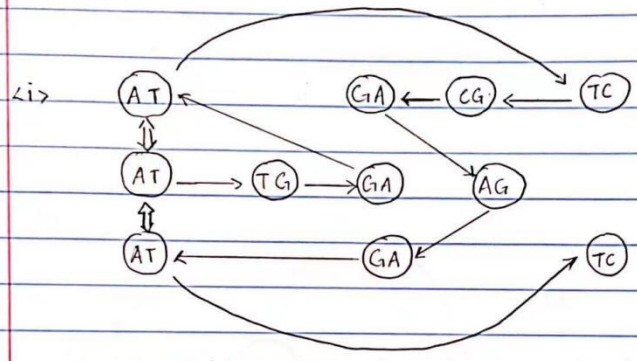
Q3 A T G A T C G A G A T C

a) De Bruijn graph with $k = 3$

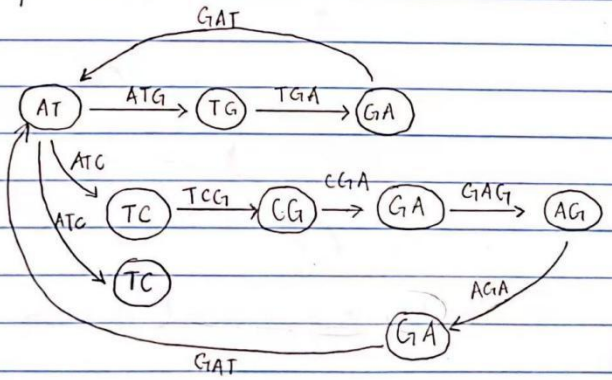
ATG TGA GAT ATC TCG CGA GAG AGA GAT ATC

AT → TG → GA → AT → TC → CG → GA → AG → GA → AT → TC

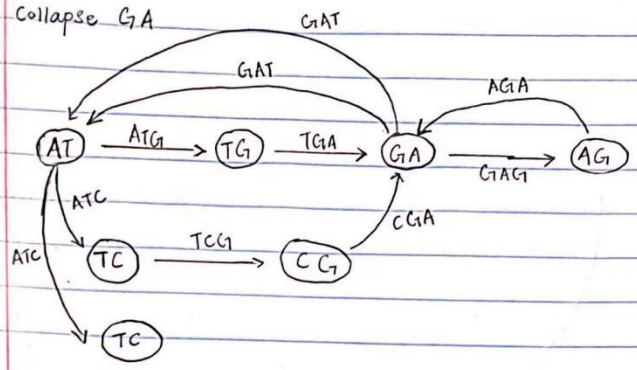
b)



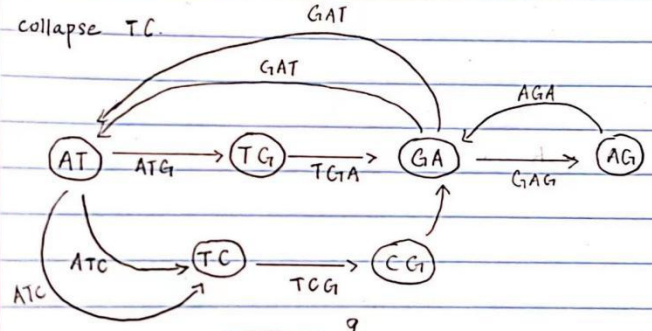
Collapse AT :



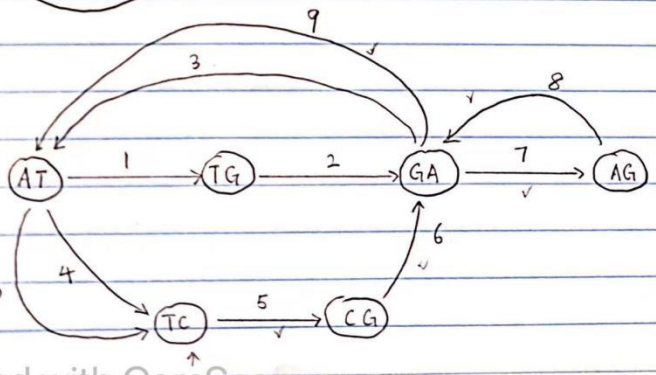
Collapse GA



collapse TC.

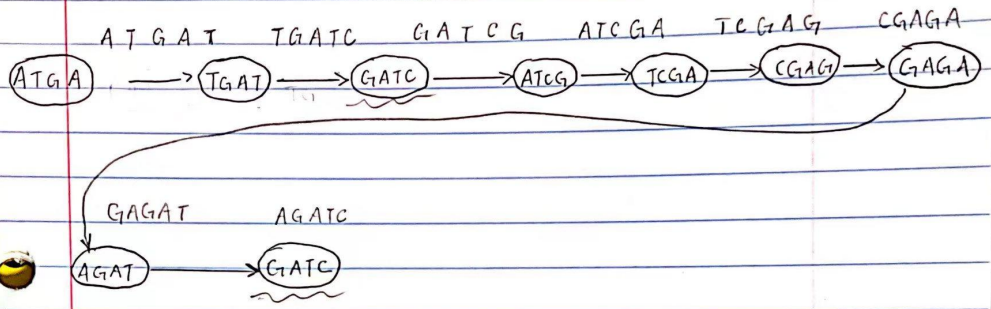


(c)

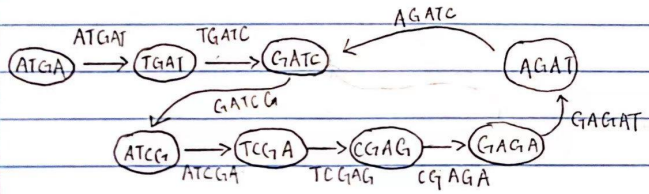


d) There's no other Eulerian path that starts with a different kmer from my graph in part c.

e) ATGATCGAGATC.

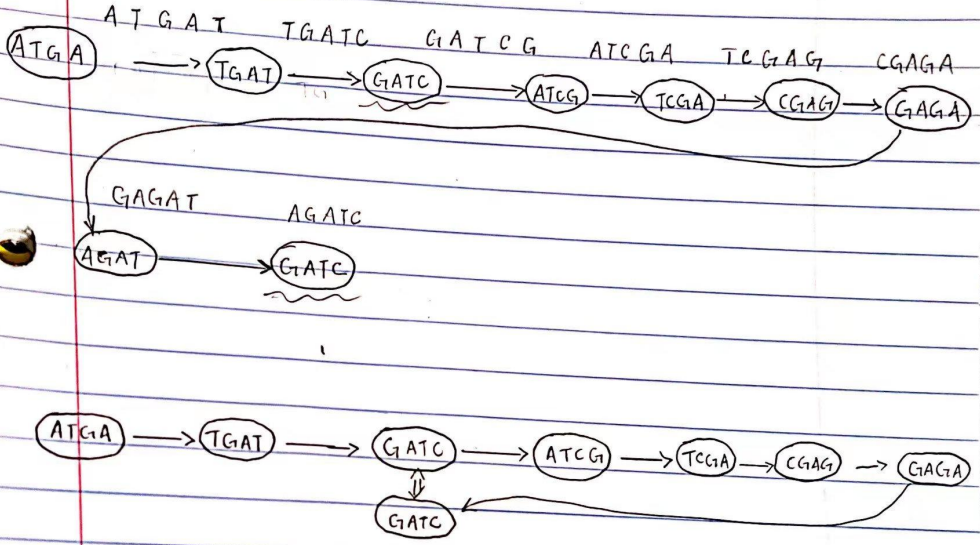


collapse GATC



d) There's no other Eulerian path that starts with a different kmer from my graph in part c

e) A T G A T C G A G A T C.



collapse GATC