UMich EECS 492 Assignment 1:Search

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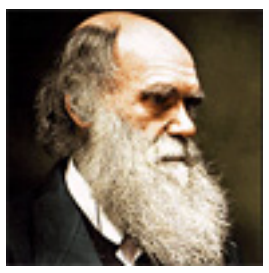
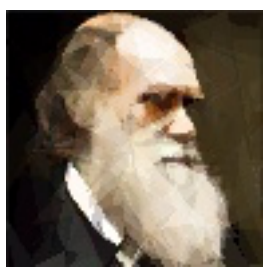
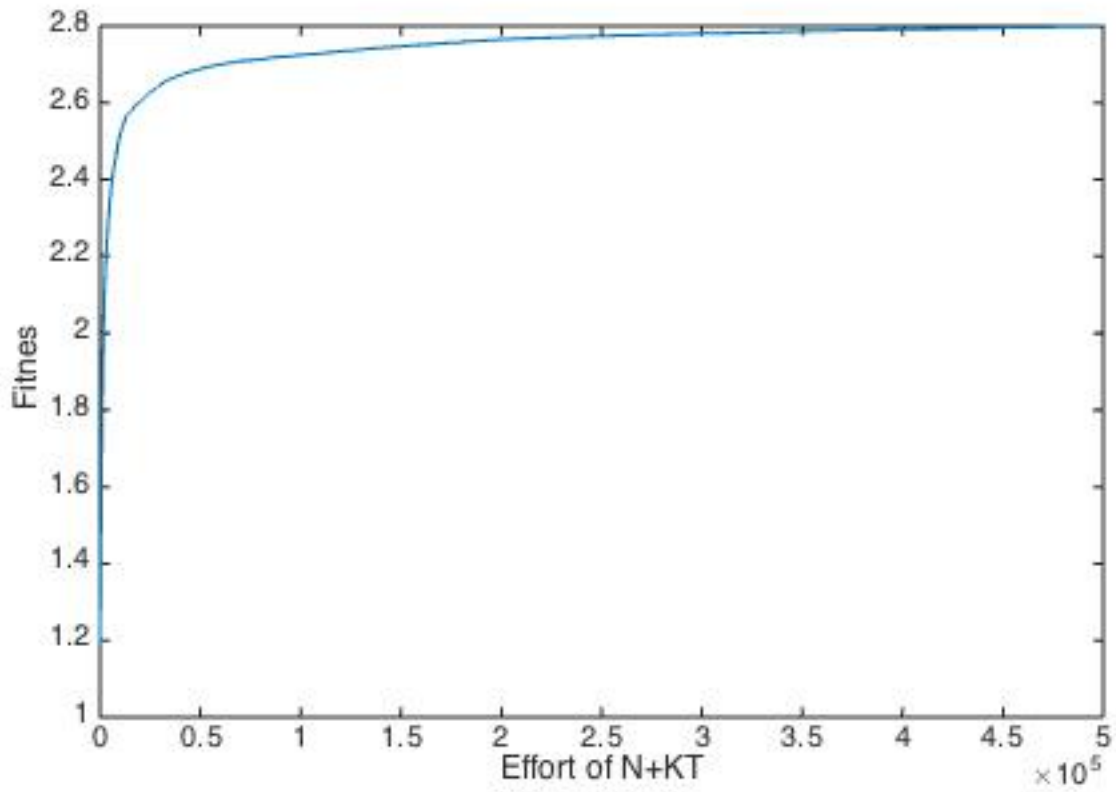
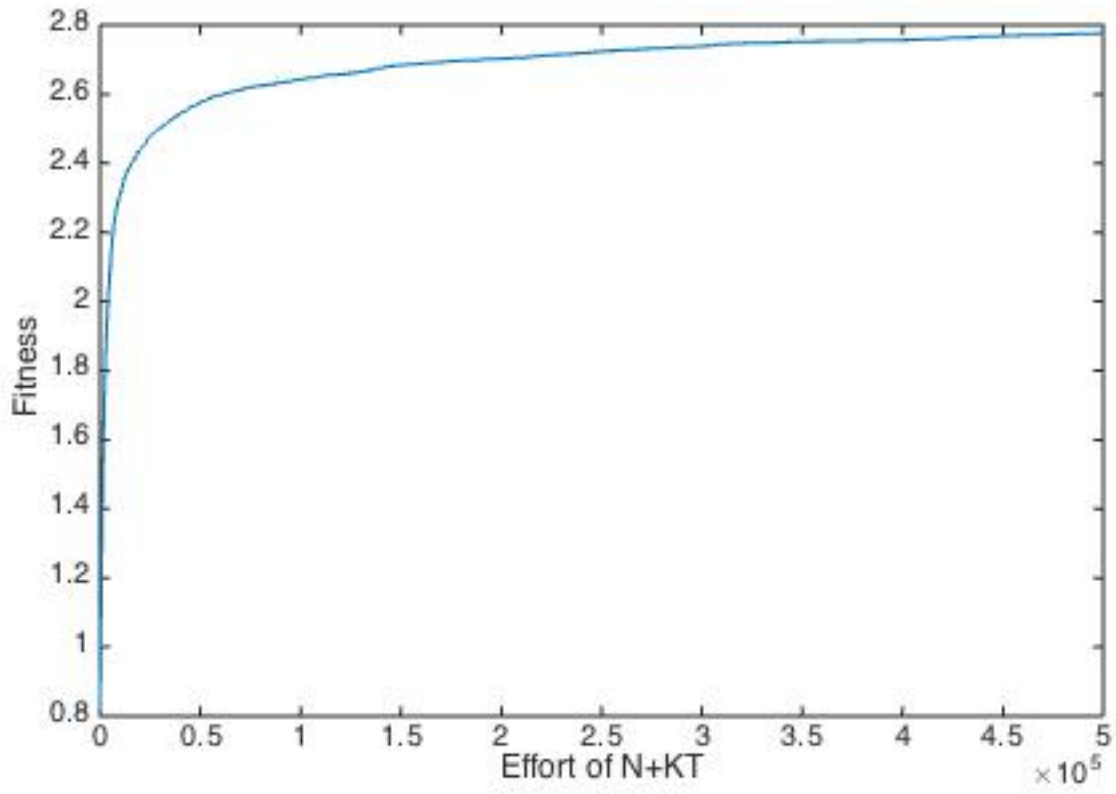
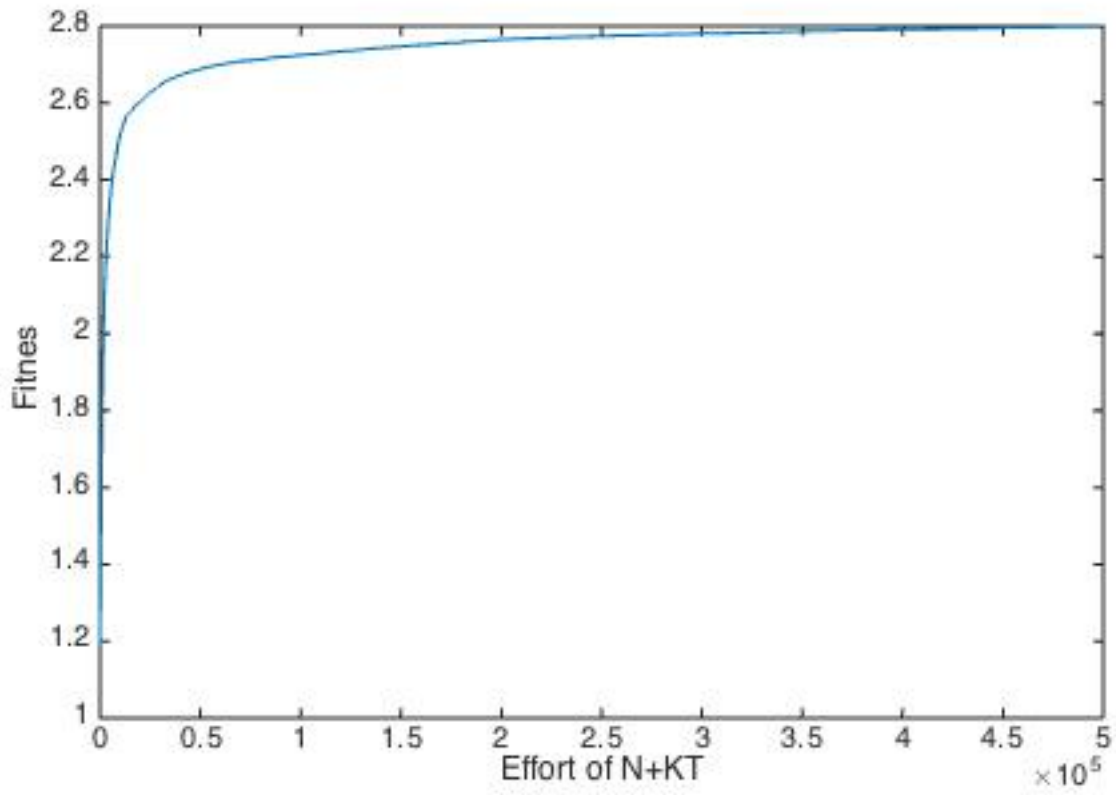
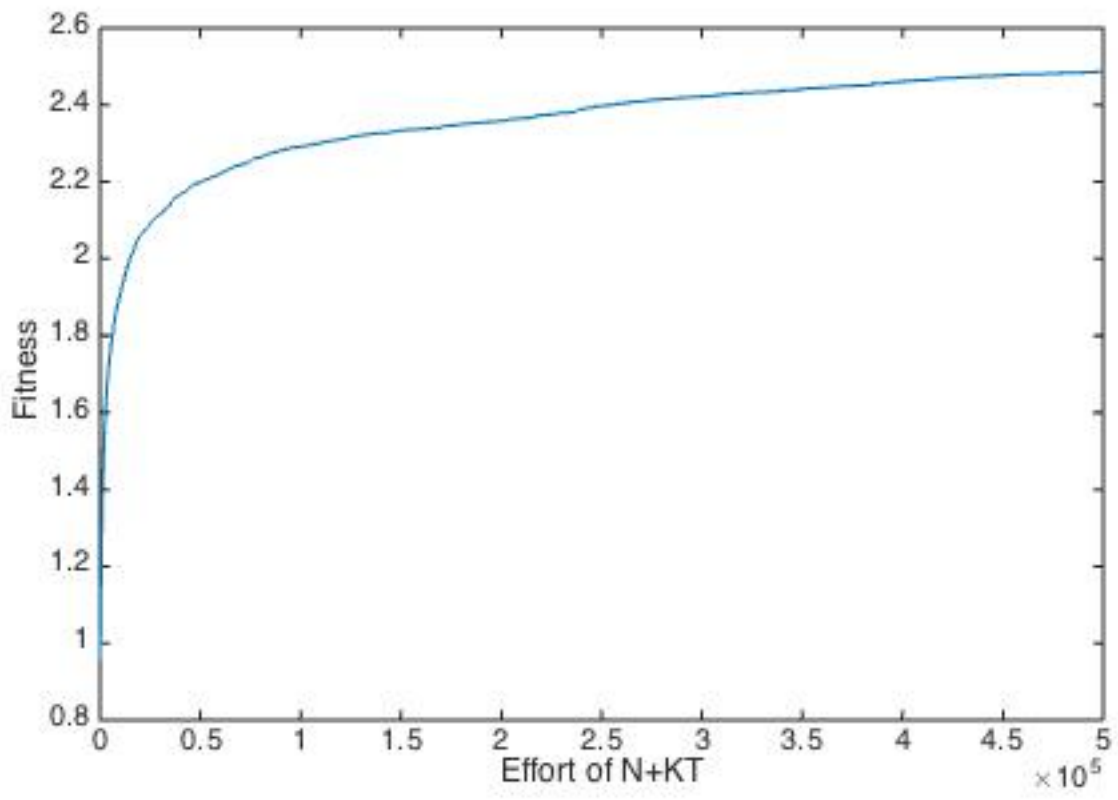
September 28,2015

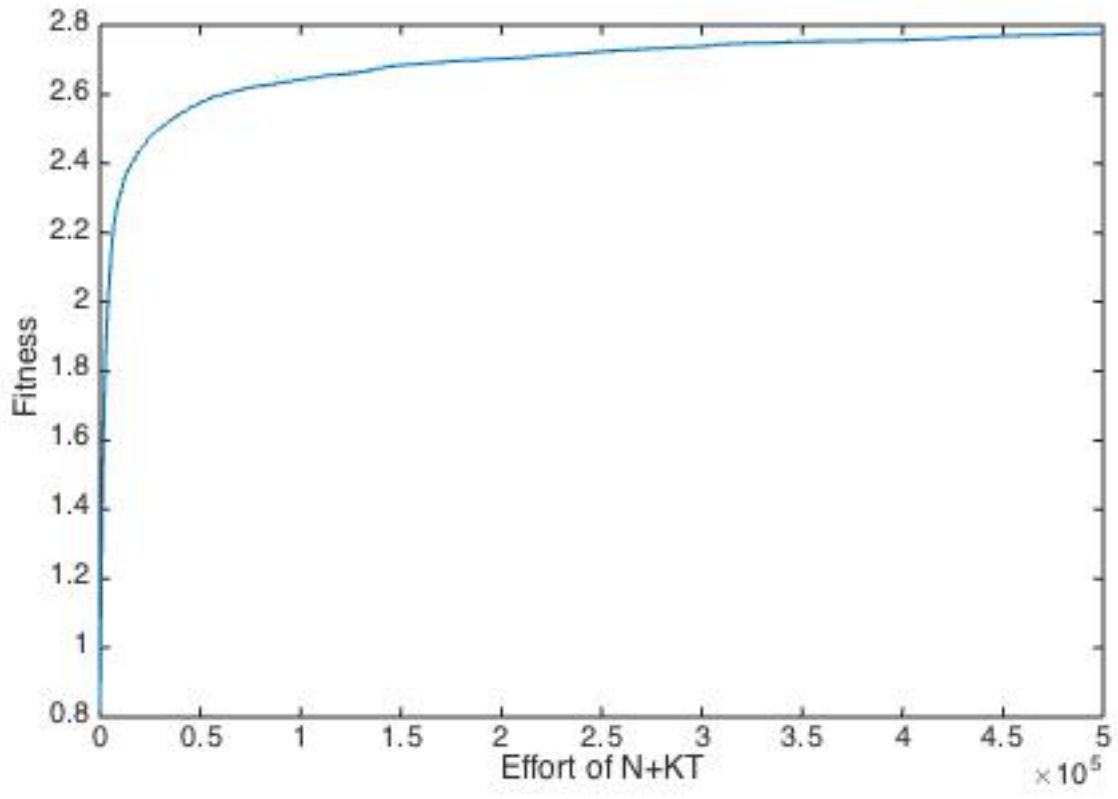
Images' fitness curve results

Original image	Approximation	Fitness curve
 96*96px		
 128*128px		
 145*170px		

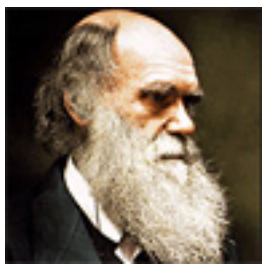
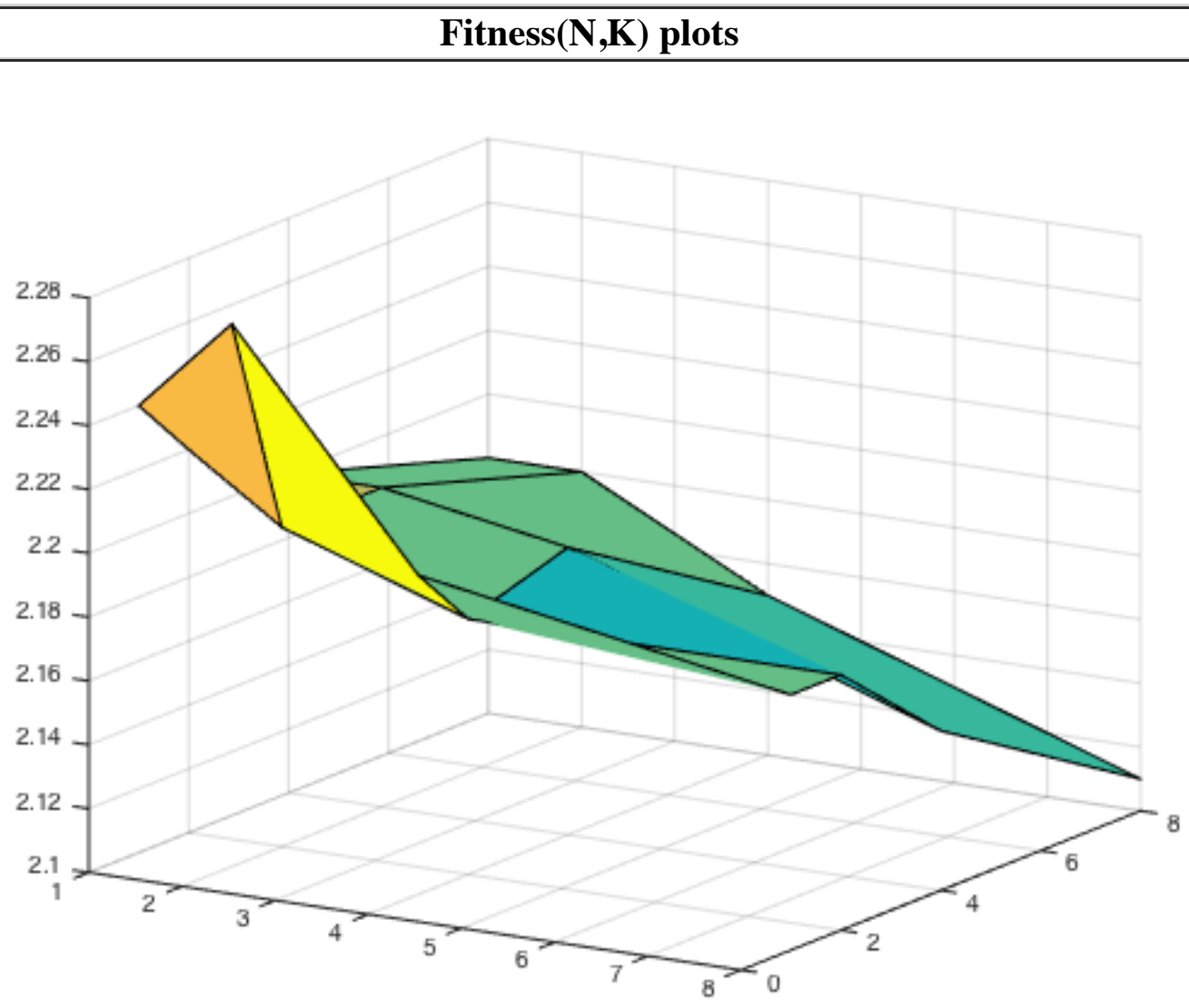
200*200px



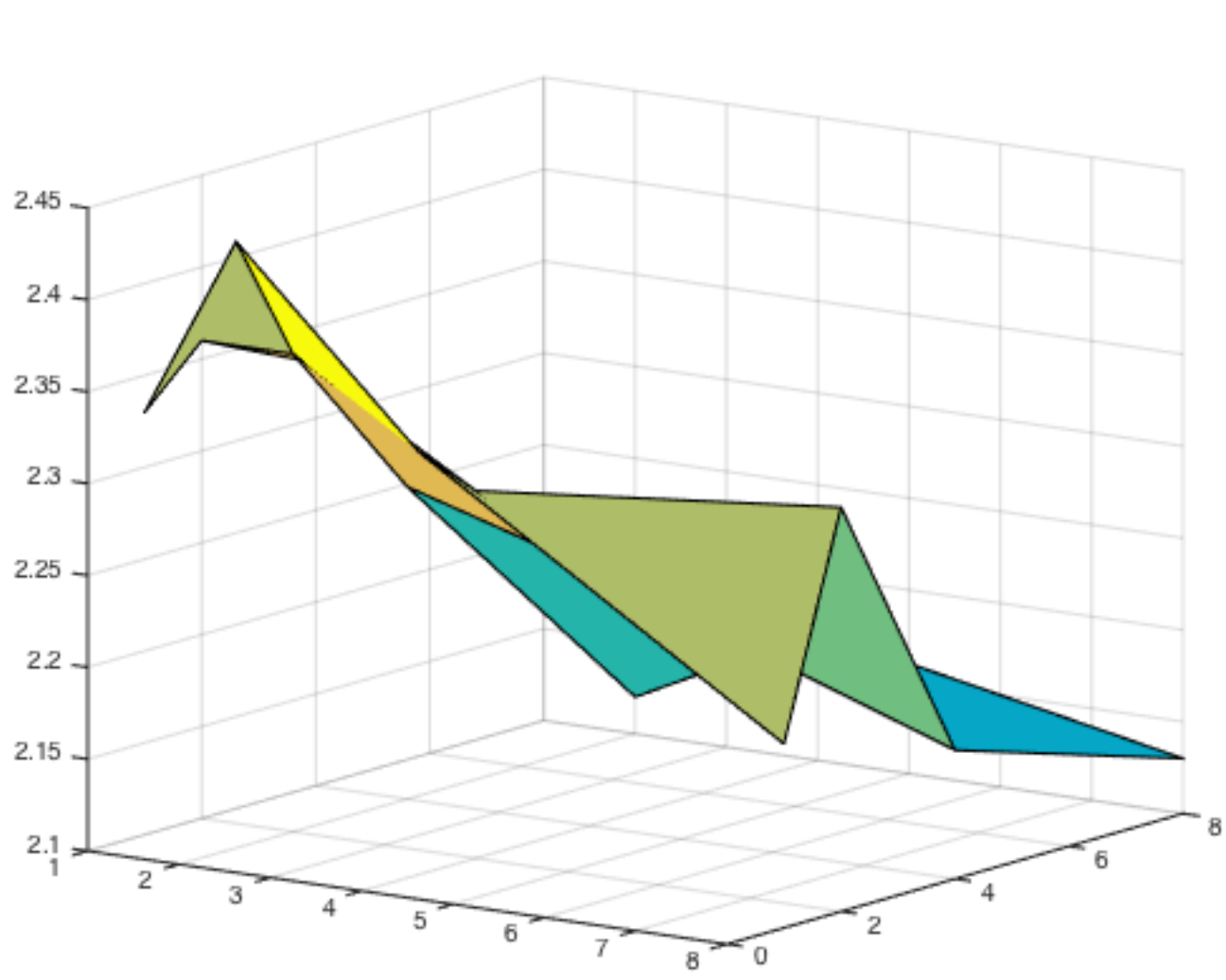
169*220px



Compare different parameters N and K

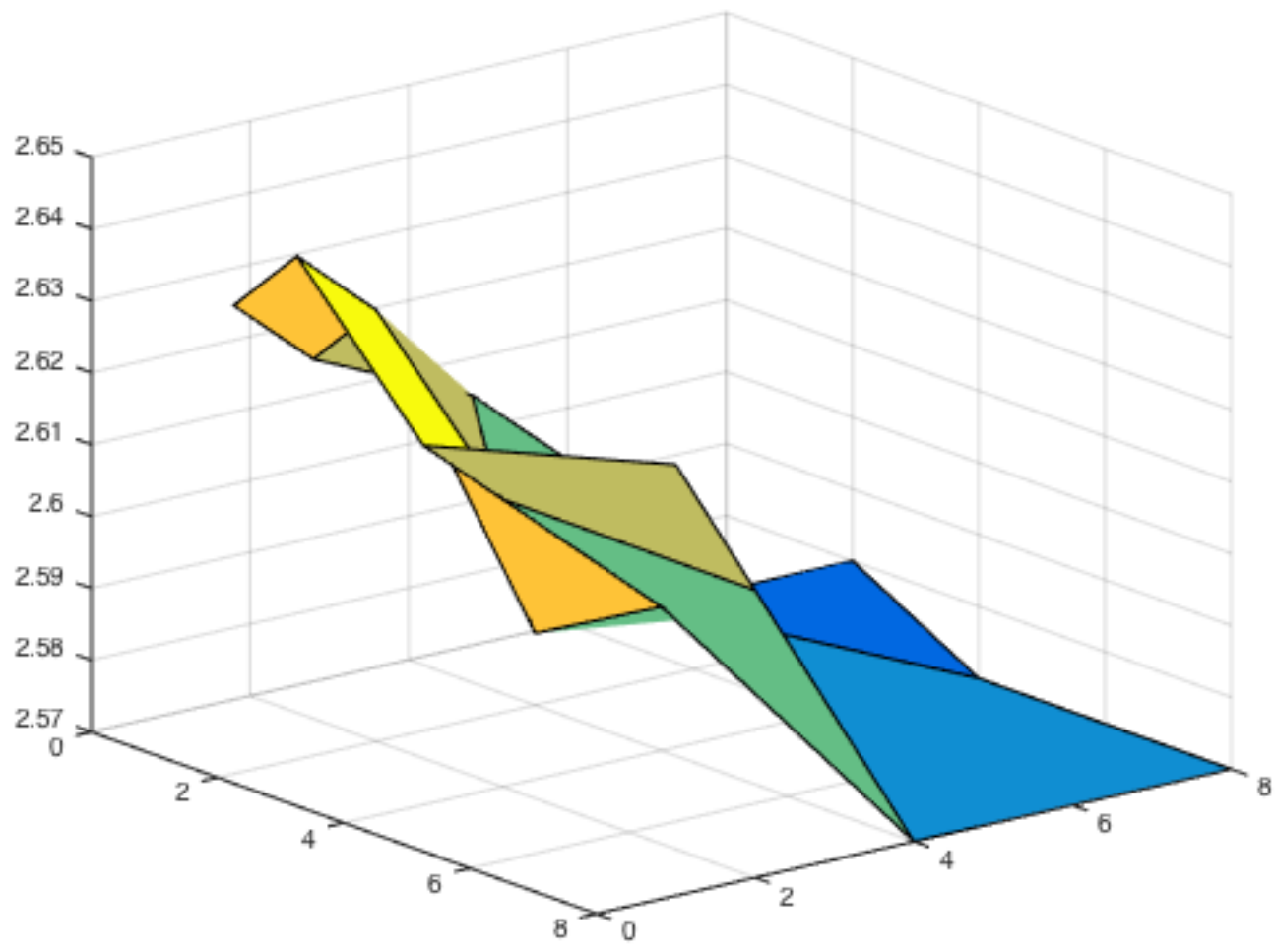
Original image	Fitness(N,K) plots	Best value
 96*96px		**N=1 K=2**

128*128px



N=1
K=2

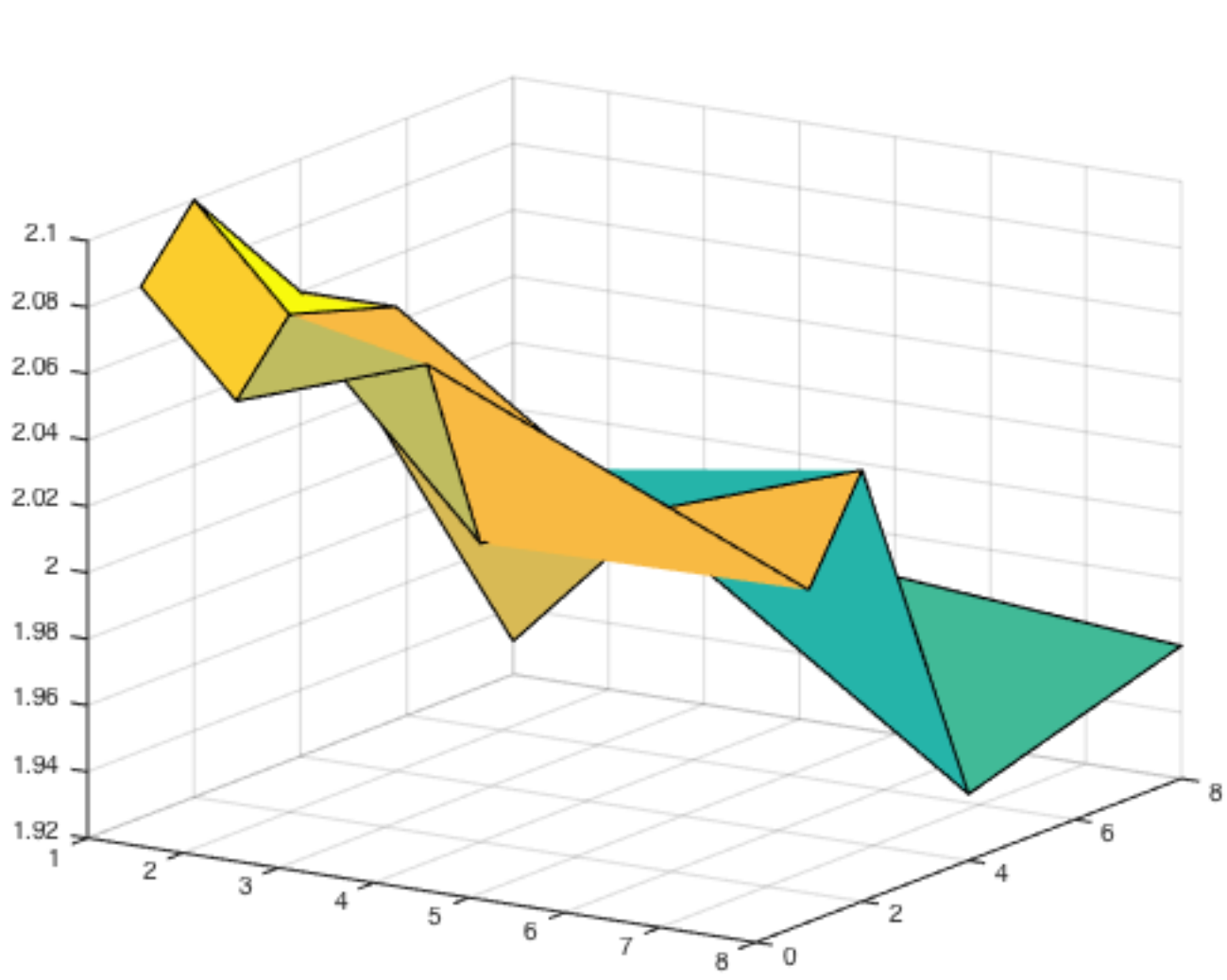
145*170px



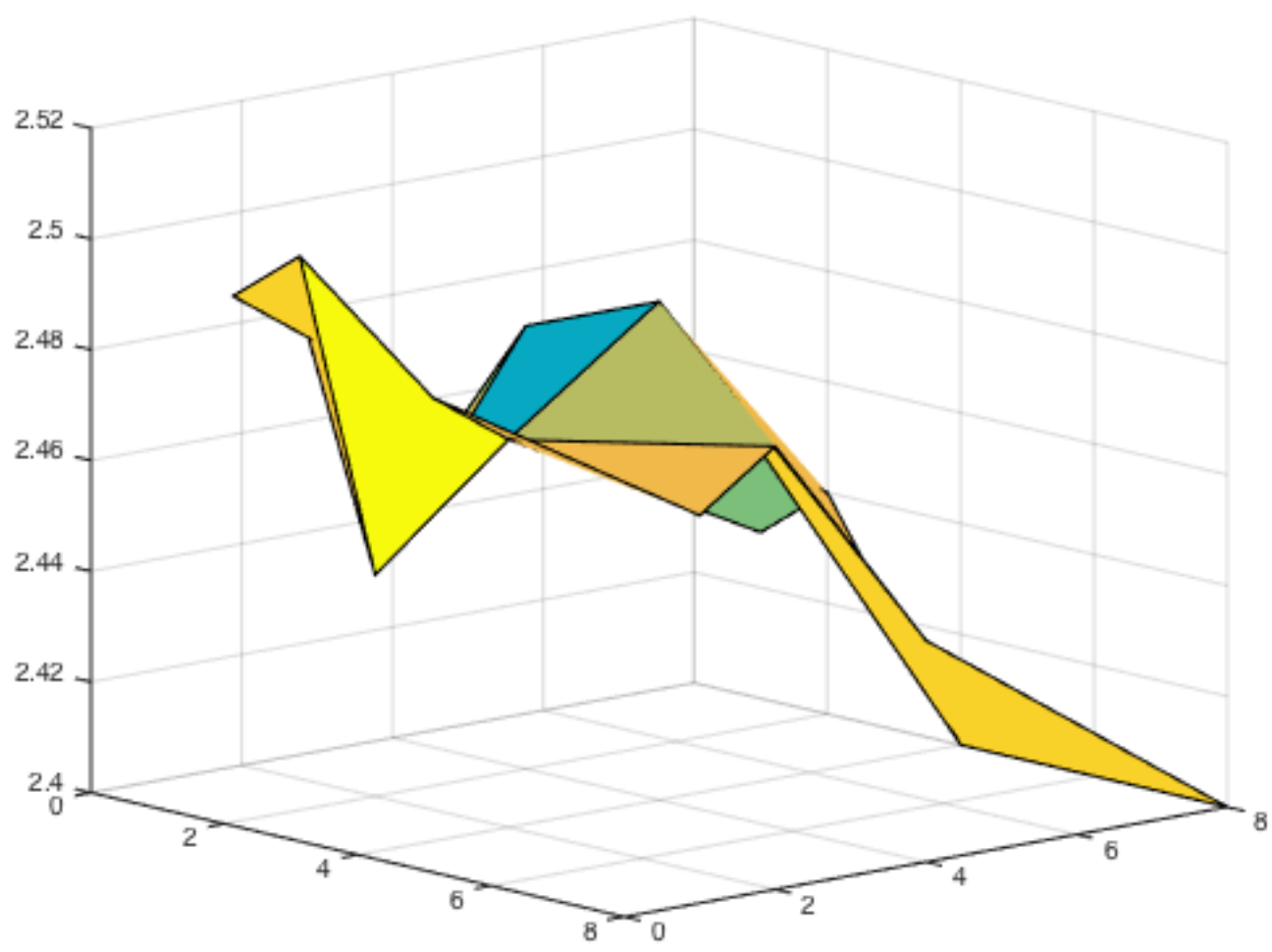
N=1
K=2

N=2
K=1

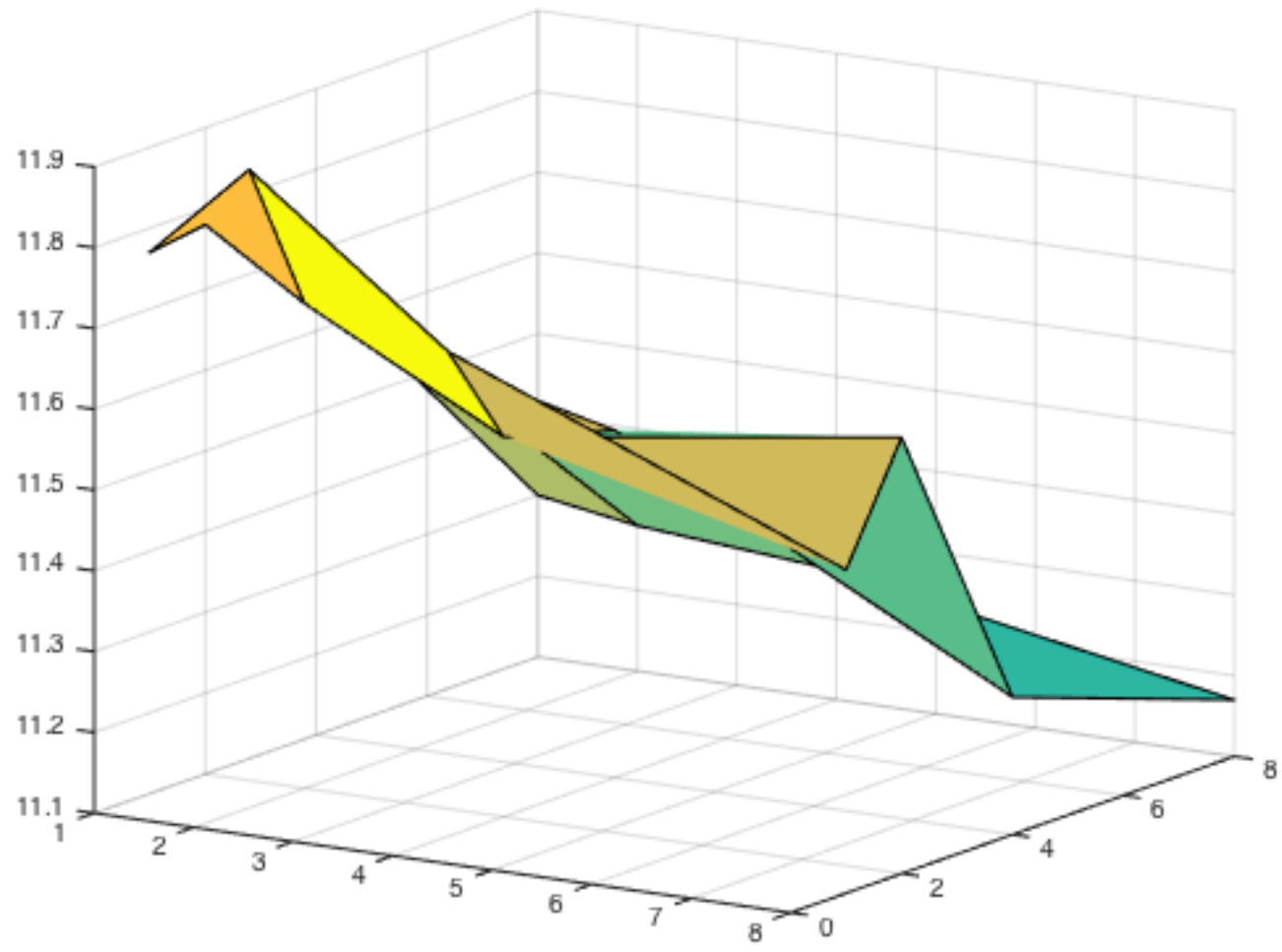
200*200px



169*220px



N=1
K=2



K=2 N=1 gave best result for 250K genration

Mutation question

Answer:Used all kinds of mutations mentioned in spec. Mutation probabilities:

- 1/4: Color mutation
- 1/12: Vertex addition mutation
- 1/12: Vertex deletion mutation
- 1/12: Vertex modification
- 1/6: Alpha mutation
- 1/6: Random polygon mutation
- 1/6: Swap two polygon

Mutation Description:
Color mutation: normal distribution centered at original color with deviation 0.1 * 255 Alpha mutation: normal distribution centered at original alpha with deviation 0.1
Add Random Vertex: normal distribution centered at mid-point of a random edge with deviation 0.01*image width (image height).
Move a vertex: normal distribution centered at original vertex with deviation 0.1 * image width (height).
Random polygon: randomly select a point as center, select three vertexes using normal distribution with deviation 0.25 * image width (height).

Parent selection question

Answer:Select parent with probability proportional to parent score (fitness).