Ανάπτυξη Λογισμικού για Αλγοριθμικά Προβλήματα 2022-2023

Project 3

Τζιώτης Ηλίας 1115201300175

Nikolas Nikandrou 1115201800224

Compile:

cmake -DCGAL_DIR=/usr/local/lib/cmake/CGAL .

Make

Run(sample):

./evaluate -i instances/data/images -o output.txt -preprocess -threshold 300000 -L 7

Η εργασία τρέχει με οποιαδήποτε σειρά των preprocess ορισμάτων L,threshold και τρέχει χωρίς αυτά με default τιμές L = 7, threshold = 300000.

Η εργασία υλοποιεί μόνο τον Incremental algorithm σε βελτιστοποίηση local_search.

Το πρόγραμμα αθροίζει 5 εφικτές λύσεις σε min και max score αντίστοιχα.

Τιμές 1 εμφανίζονται εάν η εκτέλεση ξεπεράσει τη χρονική διάρκεια cut off ή τα δείγματα δεν είναι αρκετά.

Παρακάτω τα συμπεράσματα .

Report
Steady threshold, variable L
L = 10
Threshold = 300000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	3.39578	2.37267	0.679592	0.423452
20	3.49481	3.49372	0.699576	0.698743
50	2.33874	2.33874	0.467748	0.467748
60	2.61807	2.61807	0.523618	0.523613
70	2.95506	2.79835	0.591013	0.551835
100	2.51037	2.44074	0.502075	0.467259
200	2.69681	2.64433	0.539361	0.526243
500	2.19933	2.16245	0.439867	0.425578
800	2.07404	2.04723	0.414808	0.407165
600	1.87989	1.87986	0.375985	0.375972
10	2.63867	1	0.539491	1
10	3.66899	1	0.733799	1
20	2.75398	1	0.550796	1
90	2.99771	2.89446	0.599541	0.573729
300	2.44101	2.4402	0.488319	0.488041

L = 9
Threshold = 300000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	3.39578	2.37267	0.679592	0.423452
20	3.49481	3.49372	0.699576	0.698743
50	2.8246	2.43591	0.56492	0.467748
60	2.61807	2.61807	0.523618	0.523613
70	2.95506	2.79835	0.591013	0.551835
100	2.33654	2.3363	0.467499	0.467259
200	2.63121	2.63121	0.526243	0.526243
500	2.12789	1	0.425578	0.425578
800	2.03582	1	0.407165	1
600	1.87988	1.87986	0.375978	0.375972
10	2.63867	1	0.539491	1
10	3.66899	1	0.733799	1
20	2.75398	1	0.550796	1
90	2.99771	2.89446	0.599541	0.573729
300	2.47735	2.4476	0.495488	0.488041

L = 7
Threshold = 300000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	3.10675	2.70835	0.622652	0.423452
20	3.49481	3.49372	0.699576	0.698743
50	2.8246	2.43591	0.56492	0.467748
60	2.61807	2.61807	0.523618	0.523613
70	2.95506	2.79835	0.591013	0.551835
100	2.33641	2.3363	0.467371	0.467259
200	2.77652	2.7184	0.555303	0.526243
500	2.12794	1	0.425615	0.425578
800	2.03583	1	0.407166	1
600	1.89993	1.88789	0.379987	0.375972
10	2.63867	1	0.539491	1
10	3.66899	1	0.733799	1
20	2.75398	1	0.550796	1
90	2.99771	2.89446	0.599541	0.573729
300	2.49725	2.46298	0.499532	0.488041

L = 4
Threshold = 300000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	3.10675	2.70835	0.622652	0.423452
20	3.49481	3.49372	0.699576	0.698743
50	2.8246	2.53308	0.56492	0.467748
60	2.61807	2.61807	0.523618	0.523613
70	2.95506	2.79835	0.591013	0.551835
100	2.48485	2.42543	0.49697	0.467259
200	2.83069	2.70362	0.566139	0.526243
500	2.19354	2.14102	0.438716	0.425578
800	2.03582	1	0.407165	1
600	1.90755	1.90017	0.381509	0.375972
10	2.63867	1	0.539491	1
10	3.66899	1	0.733799	1
20	2.75398	1	0.550796	1
90	2.99771	2.89446	0.599541	0.573729
300	2.48067	2.44824	0.496169	0.488041

L = 1
Threshold = 300000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	2.9845	2.635	0.598202	0.423452
20	3.49481	3.49372	0.699576	0.698743
50	2.75047	2.58572	0.550166	0.467748
60	2.78663	2.68549	0.557327	0.523613
70	2.75918	2.75918	0.551835	0.551835
100	2.4024	2.37559	0.480663	0.467259
200	2.73033	2.68788	0.546082	0.526243
500	2.12792	1	0.425602	0.425578
800	2.03582	1	0.407165	1
600	1.89501	1.88894	0.379014	0.375972
10	2.6888	1	0.549648	1
10	3.70793	1	0.753266	1
20	2.75563	1	0.552445	1
90	3.07613	2.97622	0.615227	0.573729
300	2.44025	2.4402	0.488088	0.488041

Steady L, variable threshold
L = 7
Threshold = 200000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	3.11298	2.70835	0.623598	0.423452
20	1	3.49372	0.699576	0.698743
50	2.8246	2.43591	0.56492	0.467748
60	2.61807	2.61807	0.523618	0.523613
70	2.95506	2.79835	0.591013	0.551835
100	2.53359	2.49237	0.50701	0.467259
200	2.74402	2.70996	0.548808	0.526243
500	2.15959	2.14057	0.431929	0.425578
800	2.07293	2.04808	0.414594	0.407165
600	1.90195	1.8931	0.380398	0.375972
10	2.63867	1	0.539491	1
10	3.66899	1	0.733799	1
20	2.75398	1	0.550796	1
90	2.99771	2.89446	0.599541	0.573729
300	2.48236	2.44863	0.496473	0.488041

L = 7
Threshold = 250000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	3.11298	2.70835	0.623598	0.423452
20	1	3.49372	0.699576	0.698743
50	2.8246	2.43591	0.56492	0.467748
60	2.61807	2.61807	0.523618	0.523613
70	2.95506	2.79835	0.591013	0.551835
100	2.48392	2.39534	0.496784	0.467259
200	2.69361	2.65604	0.538824	0.526243
500	2.15885	2.13408	0.43177	0.425578
800	2.03582	1	0.407165	0.407165
600	1.9135	1.88841	0.382705	0.375972
10	2.63867	1	0.539491	1
10	3.66899	1	0.733799	1
20	2.75398	1	0.550796	1
90	2.99771	2.89446	0.599541	0.573729
300	2.44035	2.4402	0.488116	0.488041

L = 7
Threshold = 350000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	3.10675	2.70835	0.622652	0.423452
20	3.49481	3.49372	0.699576	0.698743
50	2.8246	2.43591	0.56492	0.467748
60	2.61807	2.61807	0.523618	0.523613
70	2.95506	2.79835	0.591013	0.551835
100	2.46788	2.41524	0.493576	0.467259
200	2.77652	2.7184	0.555303	0.526243
500	2.12791	1	0.425592	0.425578
800	2.03584	1	0.407178	0.407165
600	1.91716	1.89595	0.383445	0.375972
10	2.63867	1	0.539491	1
10	3.66899	1	0.733799	1
20	2.75398	1	0.550796	1
90	2.99771	2.89446	0.599541	0.573729
300	2.44052	2.4402	0.488148	0.488041

L = 7
Threshold = 450000

Incremental Algorithm

Size	min score	max score	min bound	max bound
10	1	1	1	0.677443
15	3.10675	2.70835	0.622652	0.423452
20	3.4941	3.49372	0.698872	0.698743
50	2.8246	2.43591	0.56492	0.467748
60	2.61807	2.61807	0.523618	0.523613
70	2.95506	2.79835	0.591013	0.551835
100	2.50354	2.40269	0.500878	0.467259
200	2.68488	2.66342	0.536977	0.526243
500	2.12789	1	0.425578	0.425578
800	2.03582	1	0.407165	1
600	1.98822	1.94216	0.397643	0.375972
10	2.63867	1	0.539491	1
10	3.66899	1	0.733799	1
20	2.75398	1	0.550796	1
90	2.99771	2.94608	0.599541	0.573729
300	2.47267	2.45318	0.494547	0.488041

Παρατηρούμε ότι όσο μειώνεται το L τόσο μειώνεται η βελτιστοποίηση του πολυγώνου και όσο μεγαλώνει το threshold τόσο βελτιώνεται το εμβαδόν του πολυγώνου.