

Week 1 - STL			
1	Build the sum	Compute sum of input floating point numbers	Sort & then sum up
2	Even pairs	Count subarrays of $\{0,1\}^*$ array whose sum is even	Scan line or partial sums
3	Dominoes	Biggest sets intersection starting from 0	Scan line
4	Even matrices	Count submatrices of $\{0,1\}^*$ matrix whose sum is even	Partial Sums
5	False coin		
6	Deck of cards	Find subarray of positive integer array such that the sum of its elements is closer as possible to a given input k	Variable length sliding window holding elements whose sum is closest to k
Week 2 - STL - Binary Search, Sliding Window, DFS/BFS, Greedy			
7	Search snippets		Sliding Window
8	Boats	Find best scheduling of given intervals	Greedy (Earliest finish time)
9	Moving books		Greedy (heaviest carriable box)
10	Evolution		DFS on species hierarchy + Binary Search on DFS path
11	Octopussy		Greedy
Week 3 - CGAL intro - Kernels, simple Constructions, Bounding Volumes			
12	Hit	Determine whether a given ray intersects any given segment	use CGAL::do_intersect and try all segments
13	First hit	Determine first intersected segment from given ray (if any)	randomize segments order, check all segments with CGAL::do_intersect but clip ray at any intersection to reduce number of constructions
14	Hiking maps	Find triangles with lowest total associated cost so that a given path is covered by their union	Sliding window on triangles sorted ascending by cost and such that whole path is always covered
15	Antenna	Find radius of smallest circle containing all given points	Compute radius of CGAL::Min_circle_2 of all points
16	Attack of the clones		Greedy
Week 4 - BGL intro - Dijkstra, Prim/Kruskal MST, Connected/Biconnected/Strongly Connected Components, Maximum Matching			
17	First steps with BGL	Compute weight of MST and distance from node 0 to furthest one in given directed weighted graph	MST and Dijkstra
18	Ant challenge	Compute length of shortest path between two points in a directed multi-weighted graph	Merge all Prim's MSTs in a single graph, then use Dijkstra on the latter
19	Important bridges	Given undirected connected graph find edges that if removed will disconnect the graph	Compute Biconnected Components , then find those of size one.
20	Buddy selection	Find out whether a matching between students that share more than the given f characteristics exists	Build undirected graph where an edge connects students sharing more than f characteristics, then compute Maximum Matching and check its size
21	TheeV	Find minimum radius that allows covering all given points with two circles having such radius, where one has centre in the first of the given points	Compute distances from first point to all others using CGAL::squared_distance and then sort ascending. Perform Binary Search computing each time CGAL::Min_circle_2 of excluded points.
Week 5 - STL - Dynamic Programming & Brute Force			
22	Burning coins		Dynamic programming
23	Light pattern		Dynamic programming
24	Light at the museum		Brute force with Split & List all switch states using a bit mask with one bit per switch
25	The great game		Dynamic programming
26	On her majesty's secret service	Compute minimum time so that some end vertices are reachable from starting vertices in a directed weighted graph. End vertices have fixed capacity.	Multiple Dijkstra (from each agent starting position) on input graph + Binary Search for time by calling Maximum Matching on bipartite graph start -> end whose shortest path in original graph is less or equal to current time. Add more end vertices layers to cope with capacities > 1.
27	Poker chips		Dynamic programming
Week 6 - BGL Flows - Maximum flow			
28	Coin tossing	Decide whether given coin flipping game result is feasible or not, given only partial results	Max flow on source -> game -> players -> sink graph, then check if equal to missing points
29	Shopping trip	Do edge-disjoint paths from first node to many different nodes of given undirected graph exist?	Max Flow from source to all targets on graph with edge capacities set to 1. Check if flow == targets.

30	Kingdom defence	Circulation problem in given directed graph with minimum and maximum edge and vertex capacities.	Maximum Flow Minimum Cost
31	New hope		Dynamic programming
Week 7 - Linear/Quadratic Programming with CGAL			
32	Maximize it		Linear/quadratic programming
33	Diet		Linear/quadratic programming
34	Portfolios		Linear/quadratic programming
35	Inball		Linear/quadratic programming
36	Knights		Max Flow
Week 8 - Proximity Structures in CGAL			
37	Graypes	Find shortest edge between any two given points	Delaunay on given points, then find shortest edge
38	Bistro		Delaunay
39	H1N1	Is motion of disk with ray d possible within given points?	Delaunay + DFS on its faces
40	Germes		Delaunay
41	Stamps		Linear Programming + CGAL::do_intersect
Week 9 - BGL Flows II - Maximum Flow Minimum Cut, Bipartite Matchings, Minimum Cost Maximum Flow			
42	Real estate market		Maximum Flow Minimum Cost
43	Satellites		Maximum Independent Set
44	Algocoon group		Maximum Flow Minimum Cut
45	Canteen		Maximum Flow Minimum Cost
46	Casino Royale		Maximum Flow Minimum Cost
Week 10 - Exam Preparation			
47	Odd route		Multi-Layer Dijkstra
48	Light the stage		Delaunay
49	Bonus level		Maximum Flow Minimum Cost
50	Sith		Delaunay + Binary Search + Connected Components
Week 11 - Exam Preparation			
51	Clues		Delaunay + BGL::is_bipartite + Connected Components
52	Punch		Dynamic programming
53	Carsharing		Min cost Max Flow
54	Planks		Brute force with Split & List all planks assignments by using a bit mask with two bits per plank.
Week 12 - Exam Preparation			
55	New tiles	Compute maximum number of 2x2 matrices that can be placed without overlapping in a given matrix with holes	Dynamic programming
56	Goldeneye		Delaunay + Connected Components + Binary Search + Union-Find Structure
57	Corbusier	Decide whether a non-empty subset of given integers set exists such that the sum of its elements is congruent to input i modulo input k	Take modulo k of all inputs, then iteratively compute all reachable sums modulo k considering one input at the time. Check if i is reachable.
58	Placing knights	Find maximum number of knights that can be placed on a chess board with holes	Maximum Independent Set of threat graph
59	Radiation	Find lowest degree polynomial that completely separates two sets of input points	Linear programming for separation of two point sets + Binary search for lowest degree polynomial that achieves it
60	The empire strikes back		Linear programming + Delaunay
Week 13 - Exam Preparation			
61	Bobsburden		Multiple Dijkstra (from 01, k1, kk) on neighborhood graph with vertex capacity (weight), then find node with smallest total distance to 01, k1 and kk

62	DHL		Dynamic programming
63	Sweepers		Check whether any Connected Component contains an Euler Tour starting from input position and ending in some output position.
64	Portfolio revisited		Linear/quadratic programming + Binary search
65	The phantom menace		Max Flow on input graph with vertex capacities to 1.
Week 14 - Exam Preparation			
66	Courier	Find maximum profit achievable by selecting a subset of jobs (each job has profit and a cost associated to needed zones)	Max Flow on source -> jobs (profit) -> needed zones (inf) -> sink (zone cost). Then compute total profit - max flow.
Only 2015 - Exam Preparation			
67	Almost antenna	Find smallest circle that contains all but one of given points	Compute radius of CGAL::Min_circle_2 of all points, then look at points on its border: if ≤ 3 try removing any of them, otherwise return radius of bigger min circle.
68	Divisor distance		
69	Monkey island	Find vertices subset of directed graph so that every vertex other vertex is reachable and the associated cost is minimum	Compute Strong Components and use DFS on strong components graph to determine components inclusion. Sum up cost.
70	Radiation 2		
71	Return of the jedi	Compute second Prim MST in given complete graph	For each edge in MST find lowest cost edge that replaces it, minimize.
72	Tetris		
73	Tracking		Multi-Layer Dijkstra