**SDA exam topics Year I. Sem. II**

1. Algorithms. Properties, methods of representation

2. Binary search. Method description, estimate number of operations required, complexity estimate

3. Basic sorts: BubbleSort, SelectionSort, InsertionSort. Algorithm description, complexity estimation and number of operations

4. Quick sorts: Qsort, MergeSort, Heapsort

5. Data structures Queue, Stack - operations, properties.

6. Data structures Binary Search Trees - operations, properties, traversal

7. Data structures. MaxHeap, minHeap - operations, properties, addition, removal elements

8. Data structures. Graphs. Definitions, properties, representations, basic operations.

9. Graphs - DFS, BFS (description, implementation, estimative complexity)

10. Computational geometry algorithms: convex hull algorithm(CH definition, algorithm description, examples)

11. Computational geometry algorithms: point position related to a vector. Point and convex polygon – reciprocal positioning.

12. Computational geometry algorithms: lines intersection point. Formulae deduction

14. General algorithmic problem-solving approaches: brute force. The brute force solution for discrete backpack problem

15. General algorithmic problem-solving approaches: divide and conquer. The D&C solution for Towers of Hanoi problem

16. General algorithmic problem-solving approaches: dynamic programming. The DP solution for discrete backpack problem.

17. Heuristic algorithms. Graph coloring problem. Greedy and optimized greedy coloring algorithms

18. Heuristic algorithms. 1 – Lambda heuristics. K – Centre and k – median problems on graphs

**How the exam will be organized:**

20 -25 multiple choice and open answer questions, including questions related to algorithm modelling (parsing).

Pre exam test (2 – 3 questions) will be opened 2 days before the basic exam.

Consultation: day before day before exam (28-th of May) 09.00. TUM, 3/3

More questions – on Messenger!