Intelligent Learning and Analysis Systems SS19, Exercise Sheet 1

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1. Finding Two Missing Items

2. Identifying the Majority

Let $\sigma = \langle a_1, \ldots, a_m \rangle$ and $a_i \in [n]$.

Algorithm 1 Algorithm for finding the majority of σ, if it exists

```
1:  c ← 0
2:  for all i ∈ [m] do
3:      if c = 0 then
4:          s ← a_i
5:          c ← 1
6:      end if
7:      if s = a_i then
8:          c += 1
9:      else
10:         c −= 1
11:     end if
12: end for
13: return s
```

3. Reservoir Sampling I.

4. Reservoir Sampling II.

5. The ϕ-HH Problem: Lower Bounds