The Evolution of Randomness Testing

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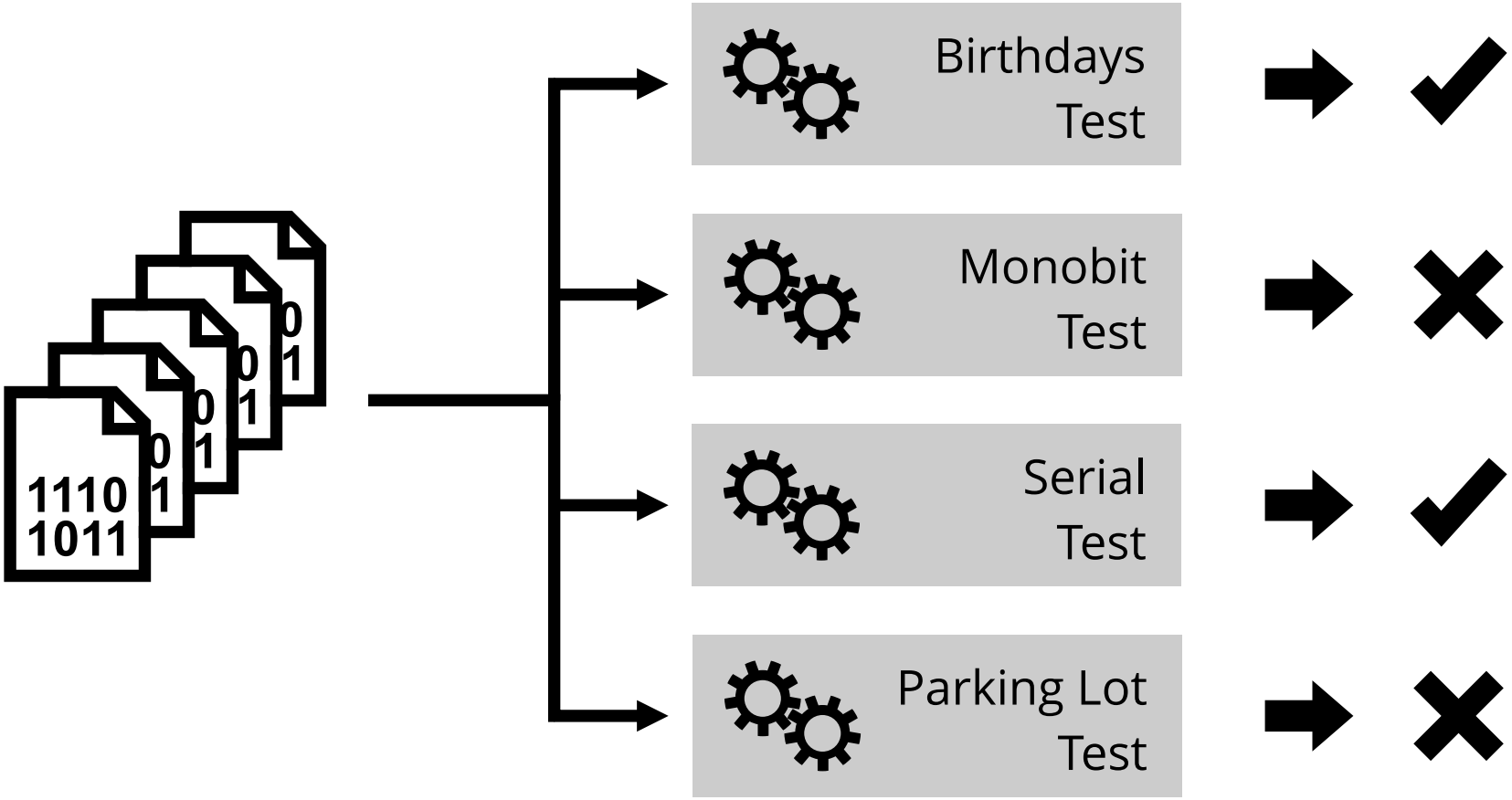
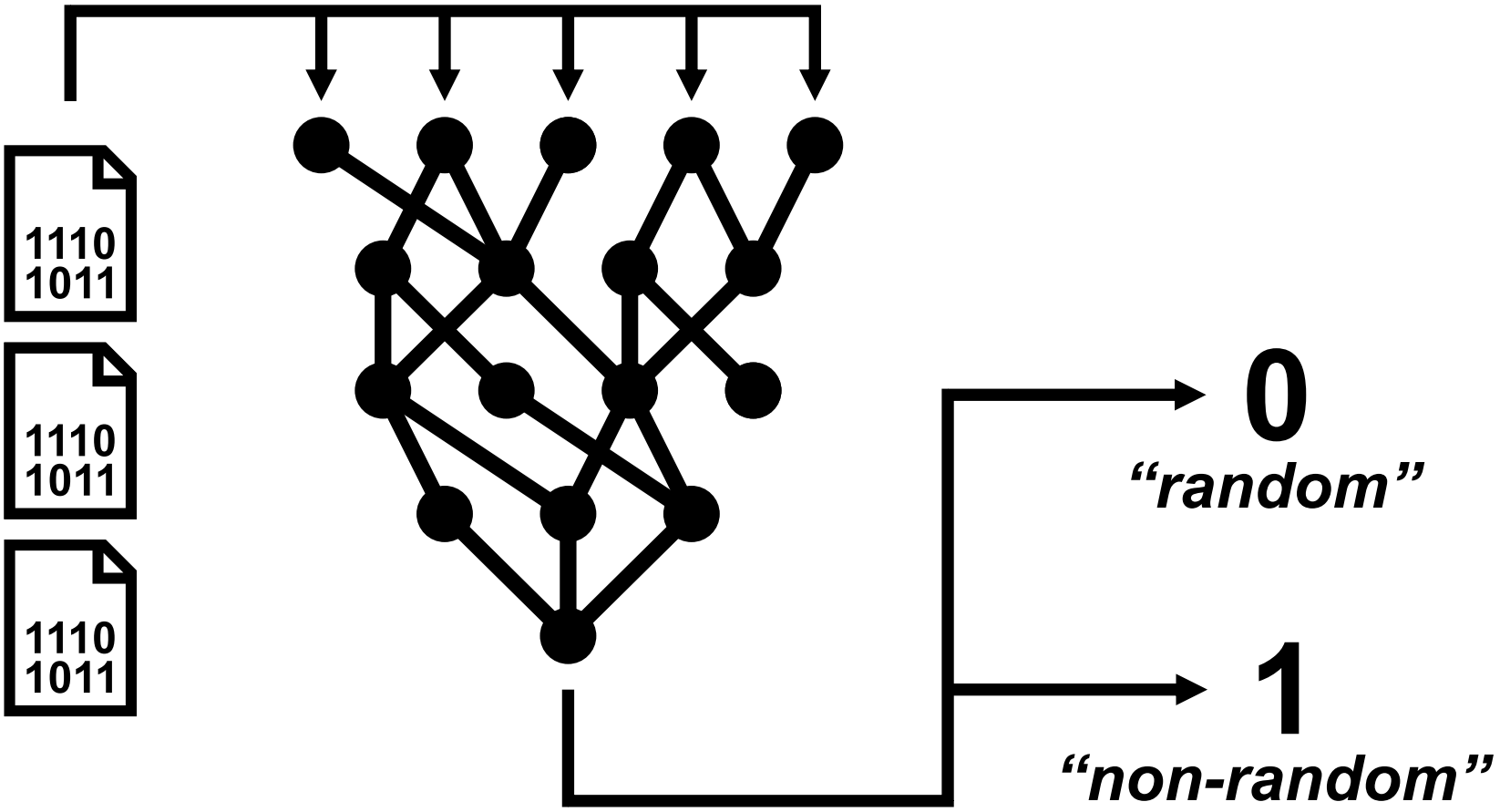
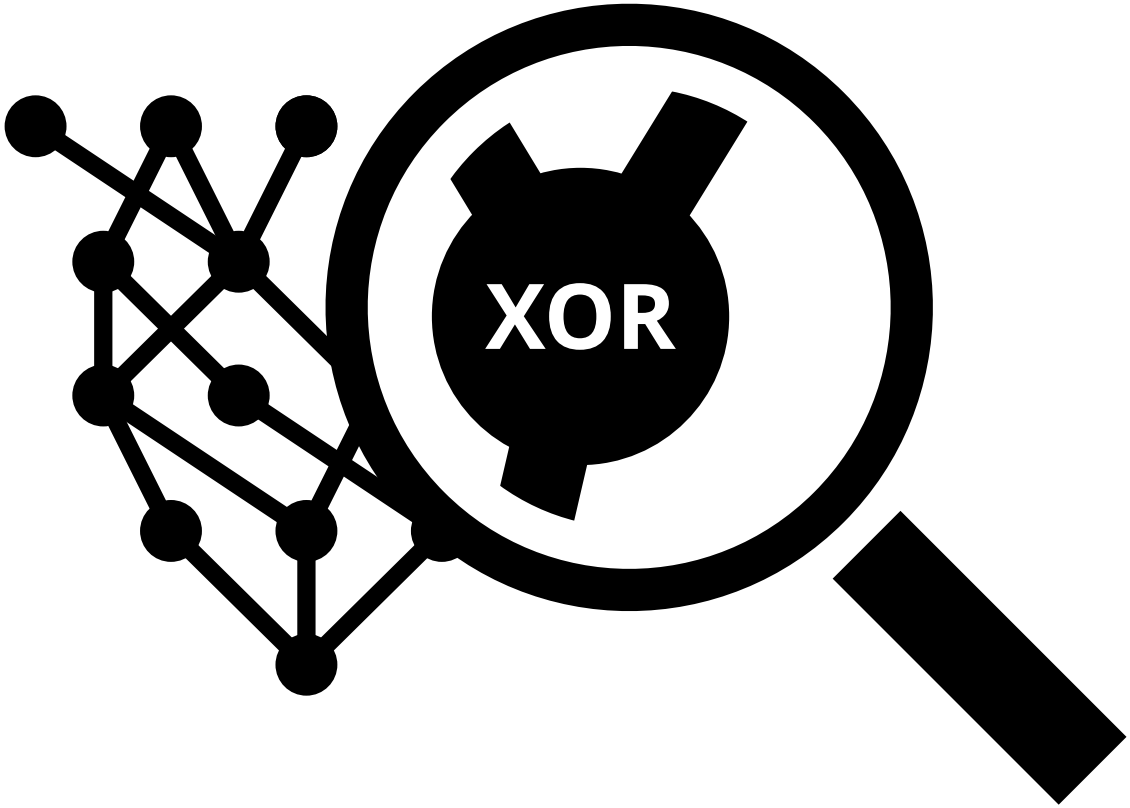
Statistical randomness tests



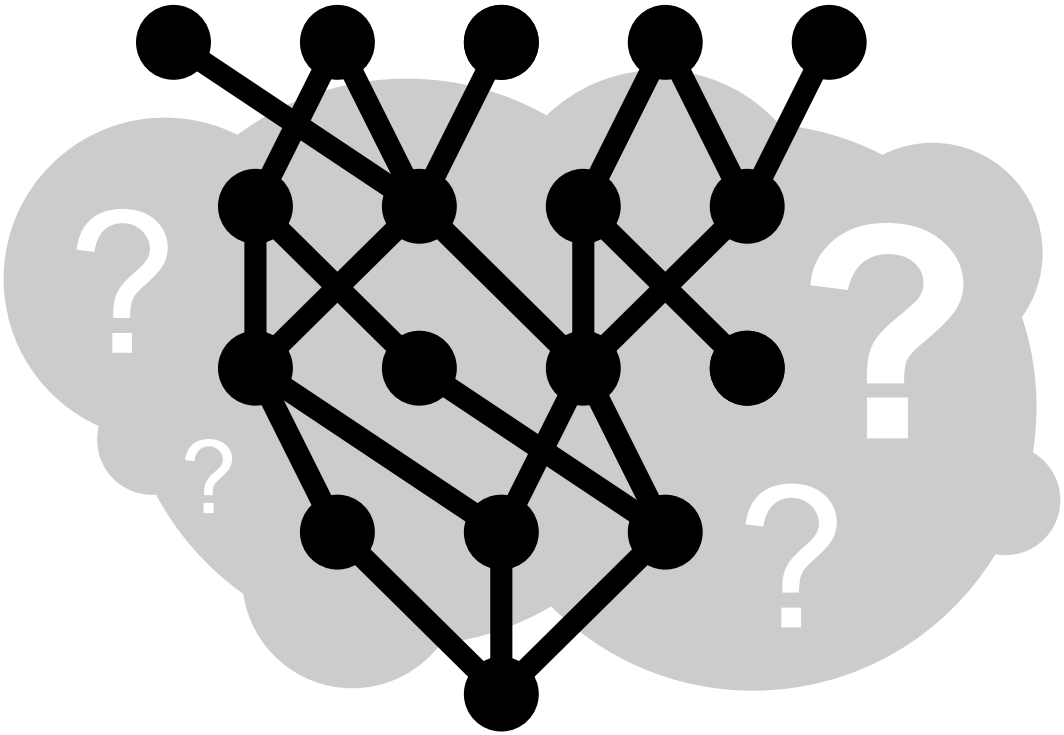
Distinguisher construction I.



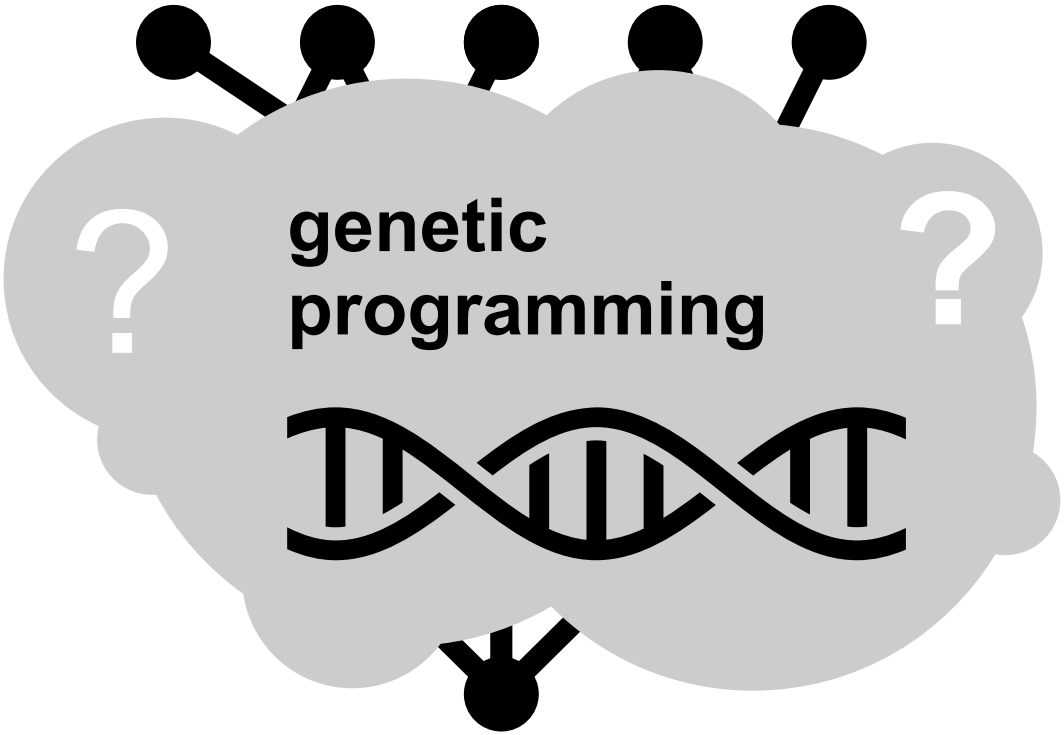
Distinguisher construction II.



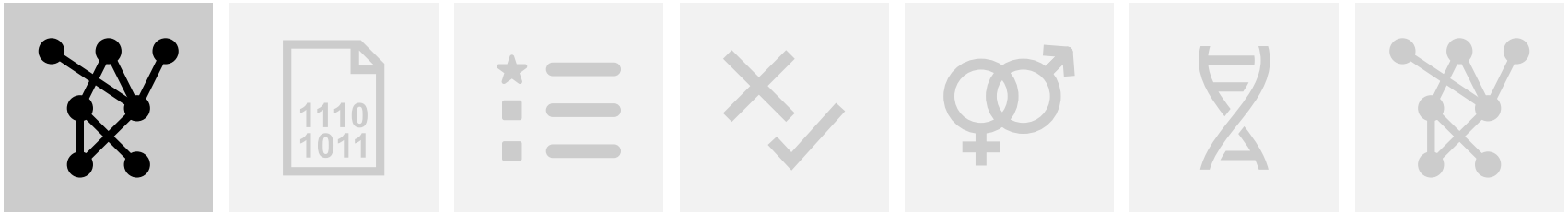
Distinguisher construction III.

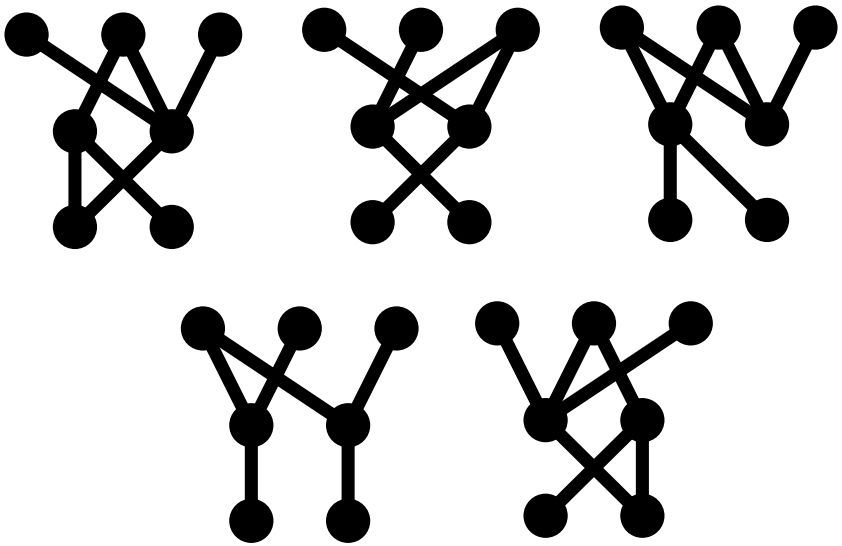


Distinguisher construction IV.

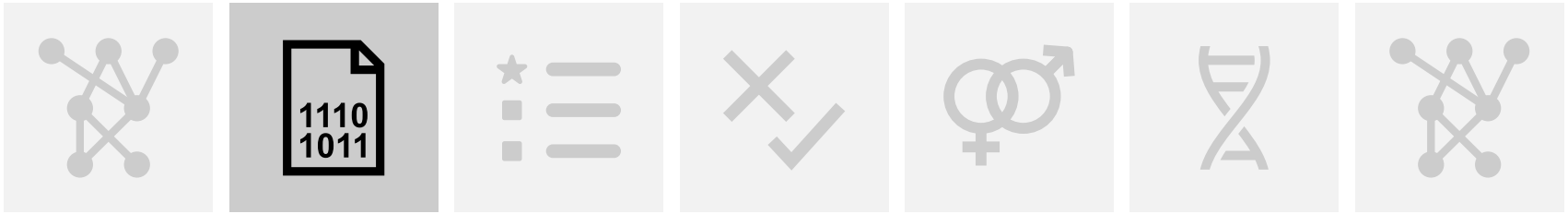


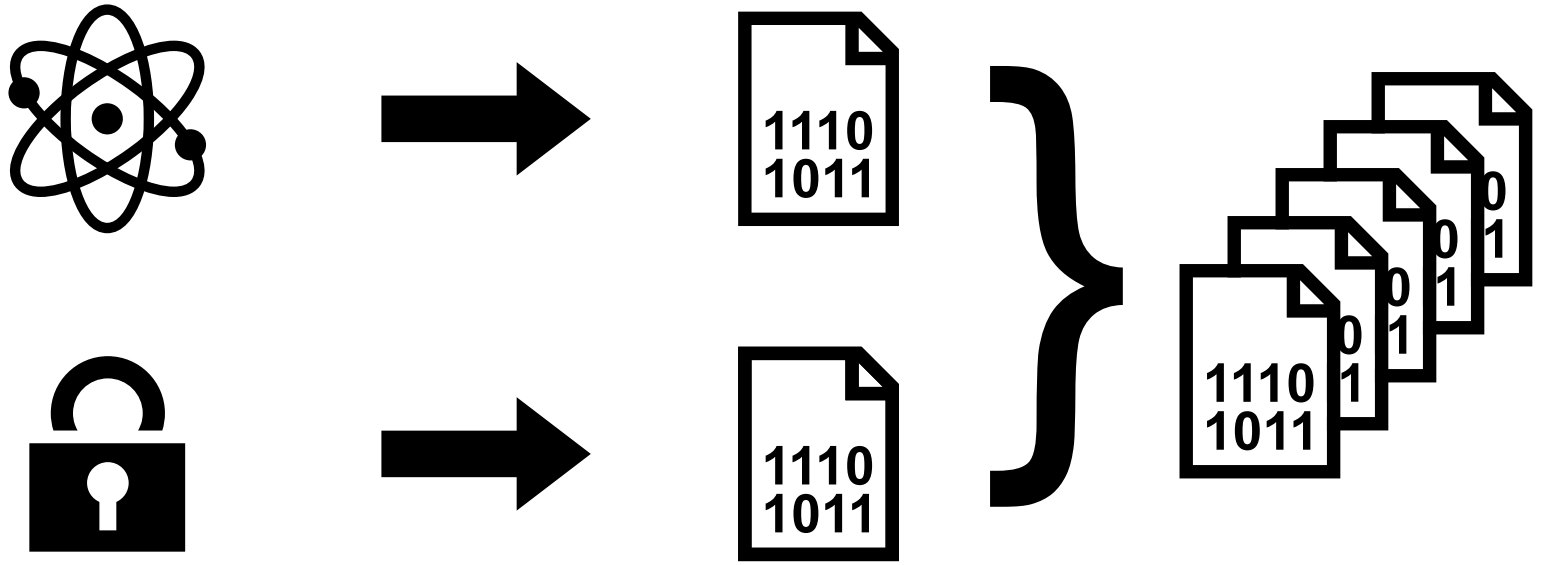
EACirc – initialization



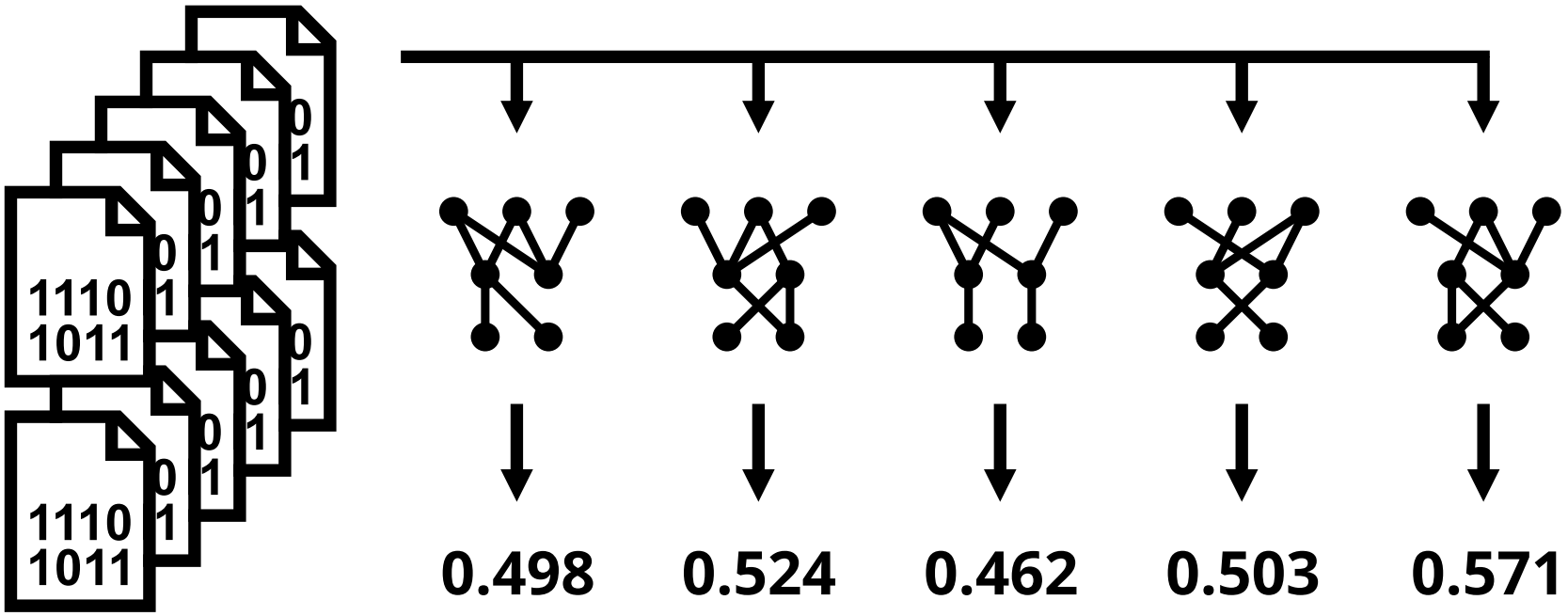


EACirc – test vector generation

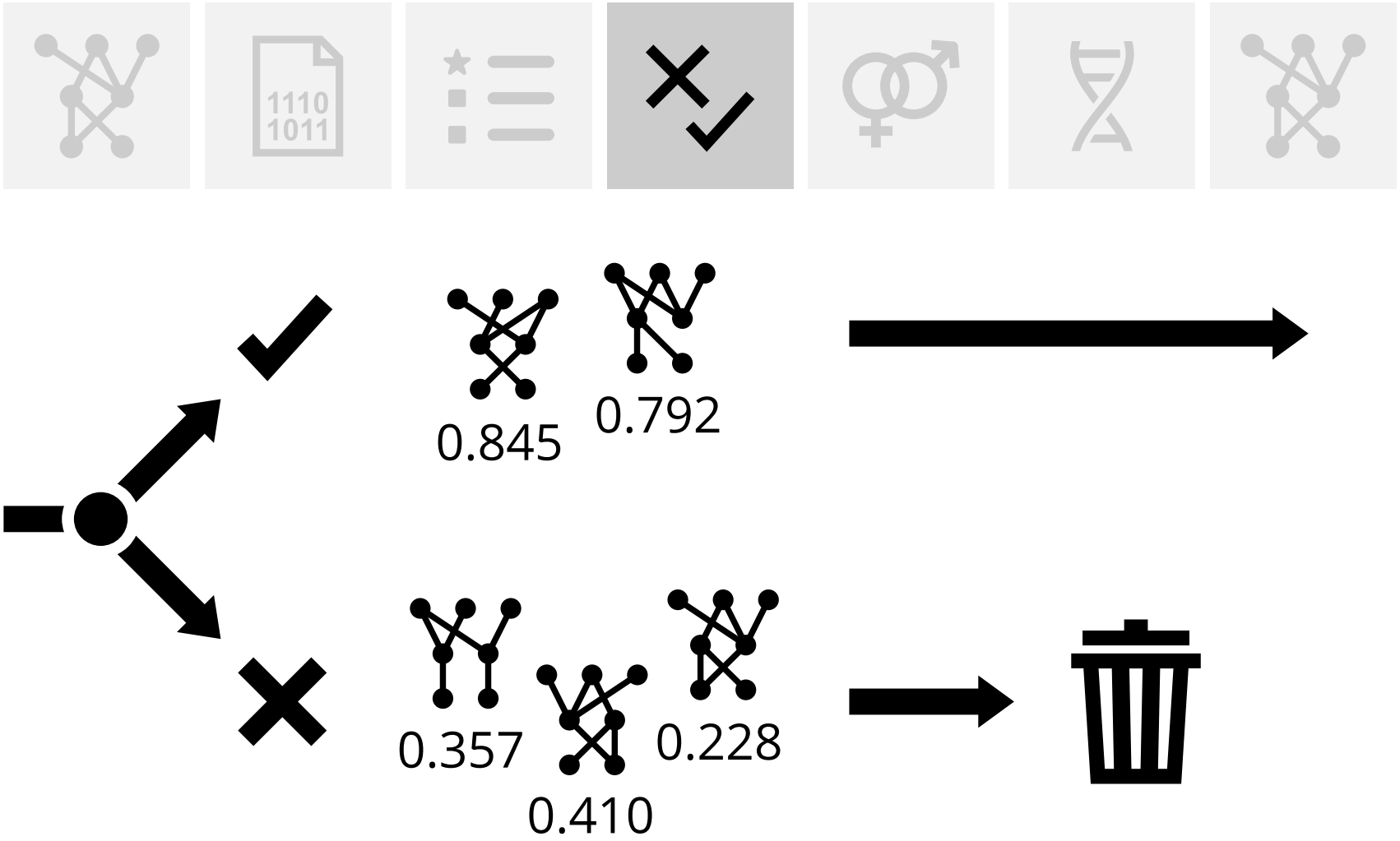




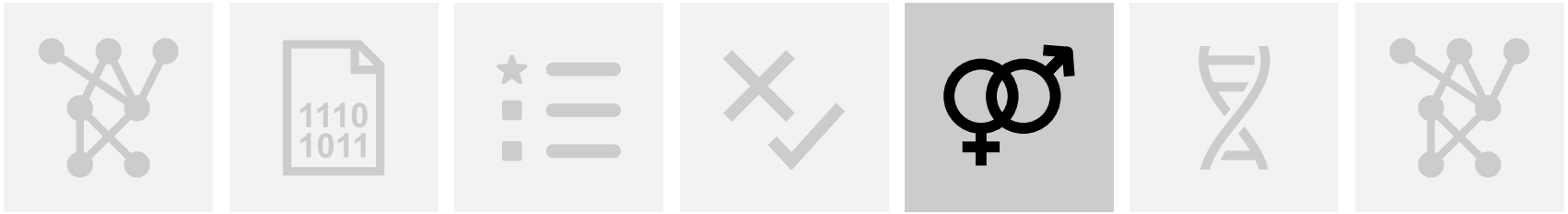
EACirc – evaluation

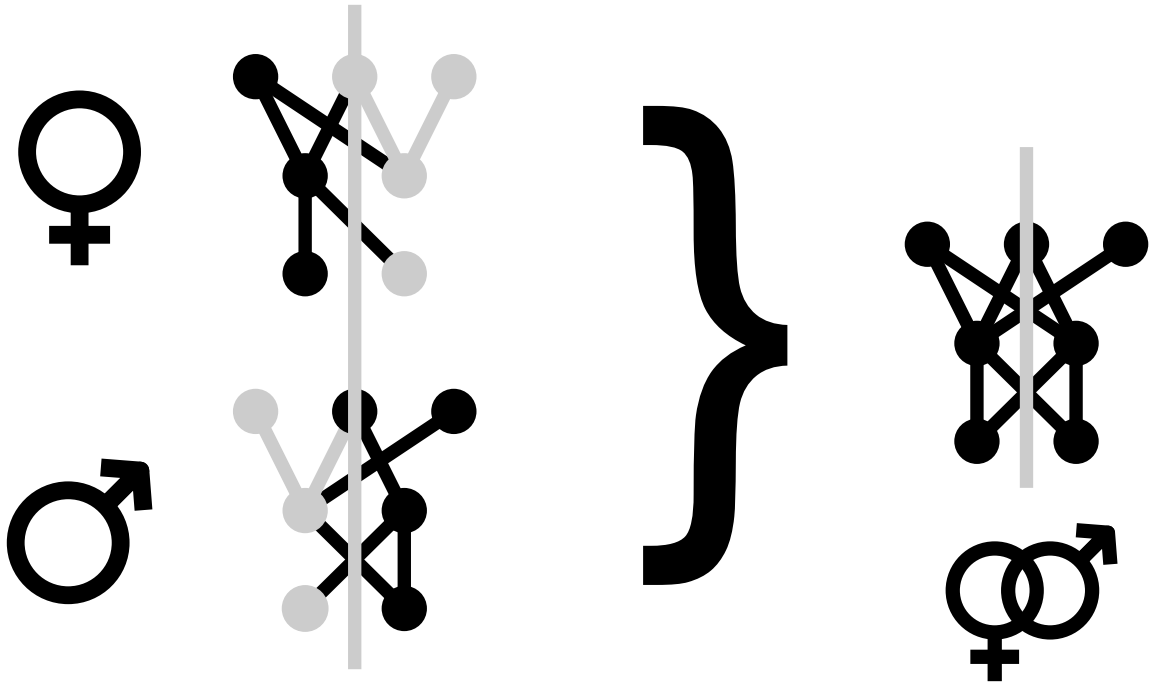


EACirc – survival

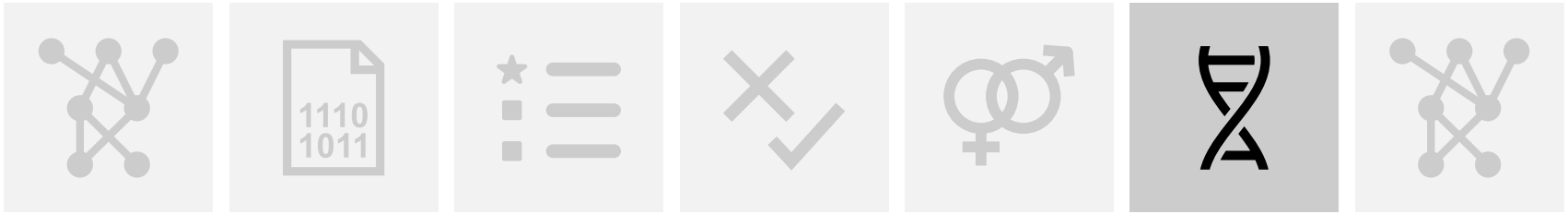


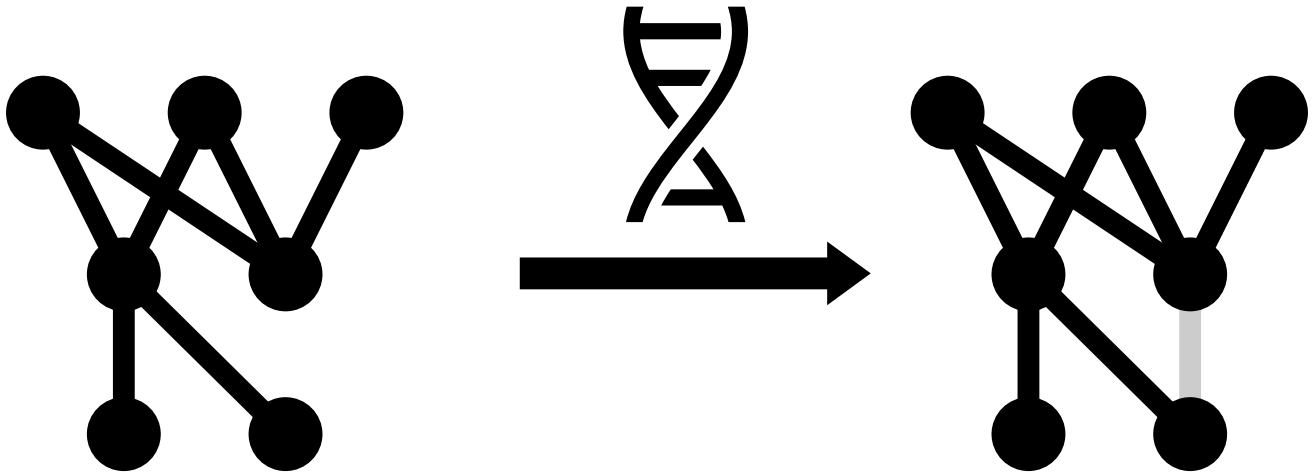
EACirc – sexual crossover



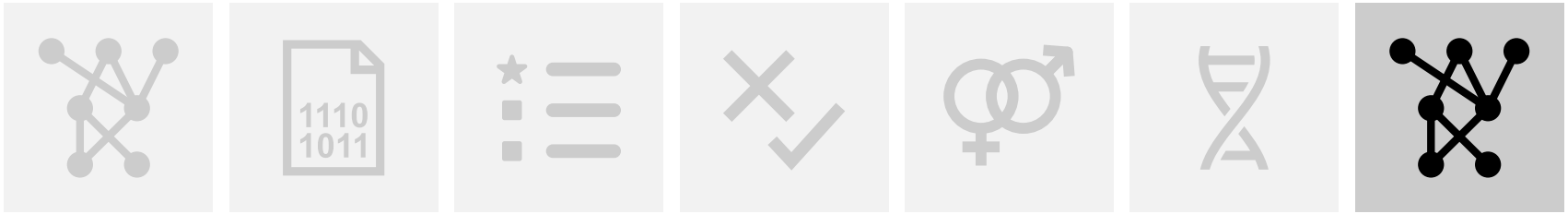


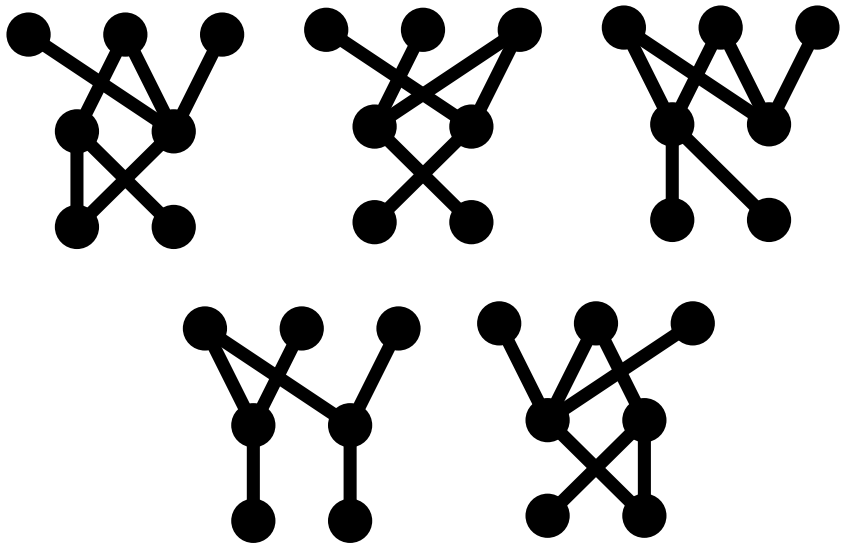
EACirc – mutation



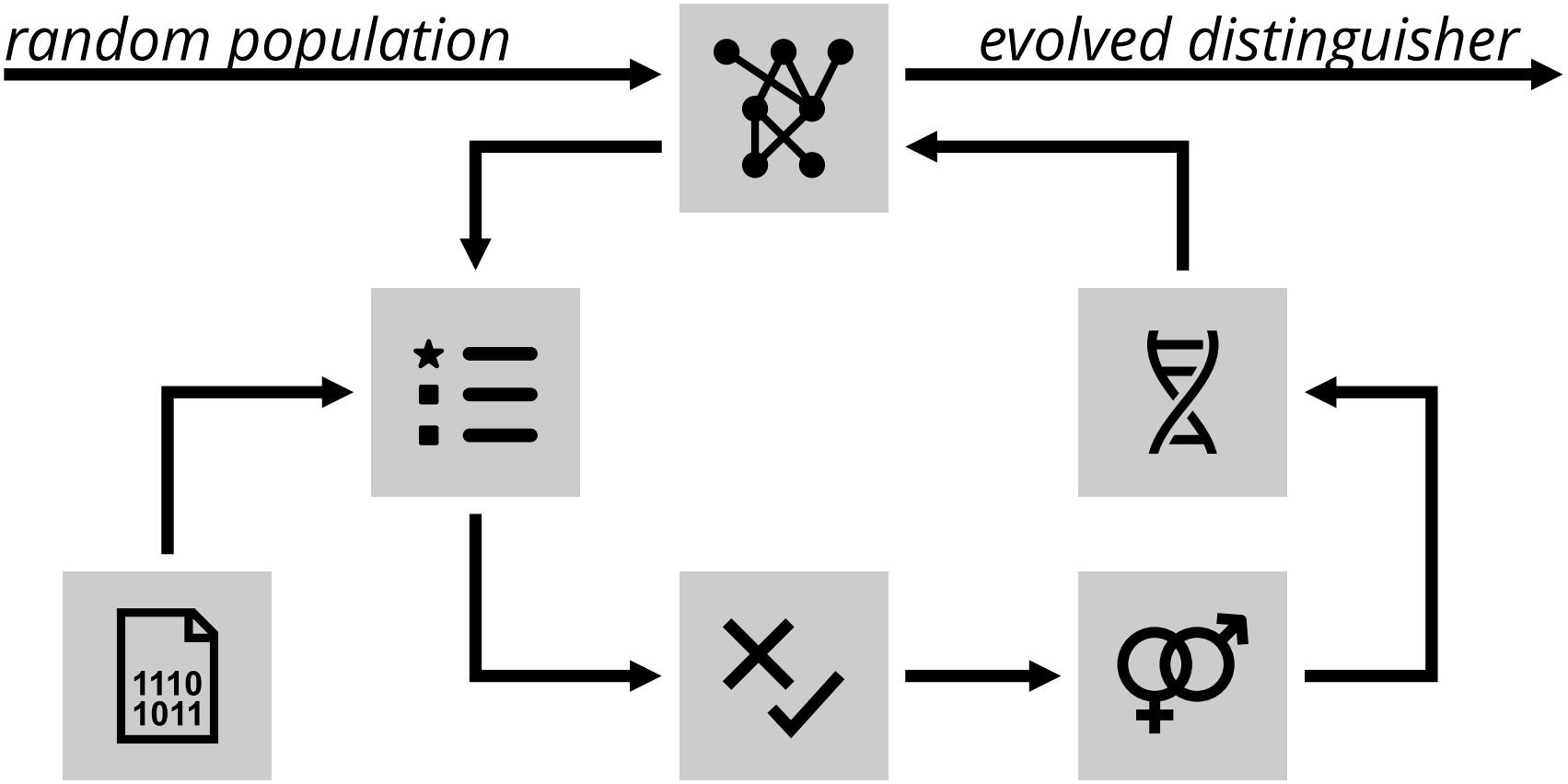


EACirc – iteration

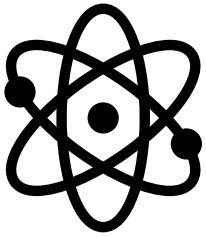




EACirc – overview



Performed experiments

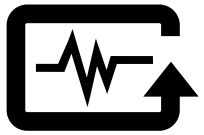


random data

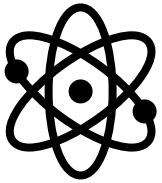
vs.

a) 7 eStream cipher candidates

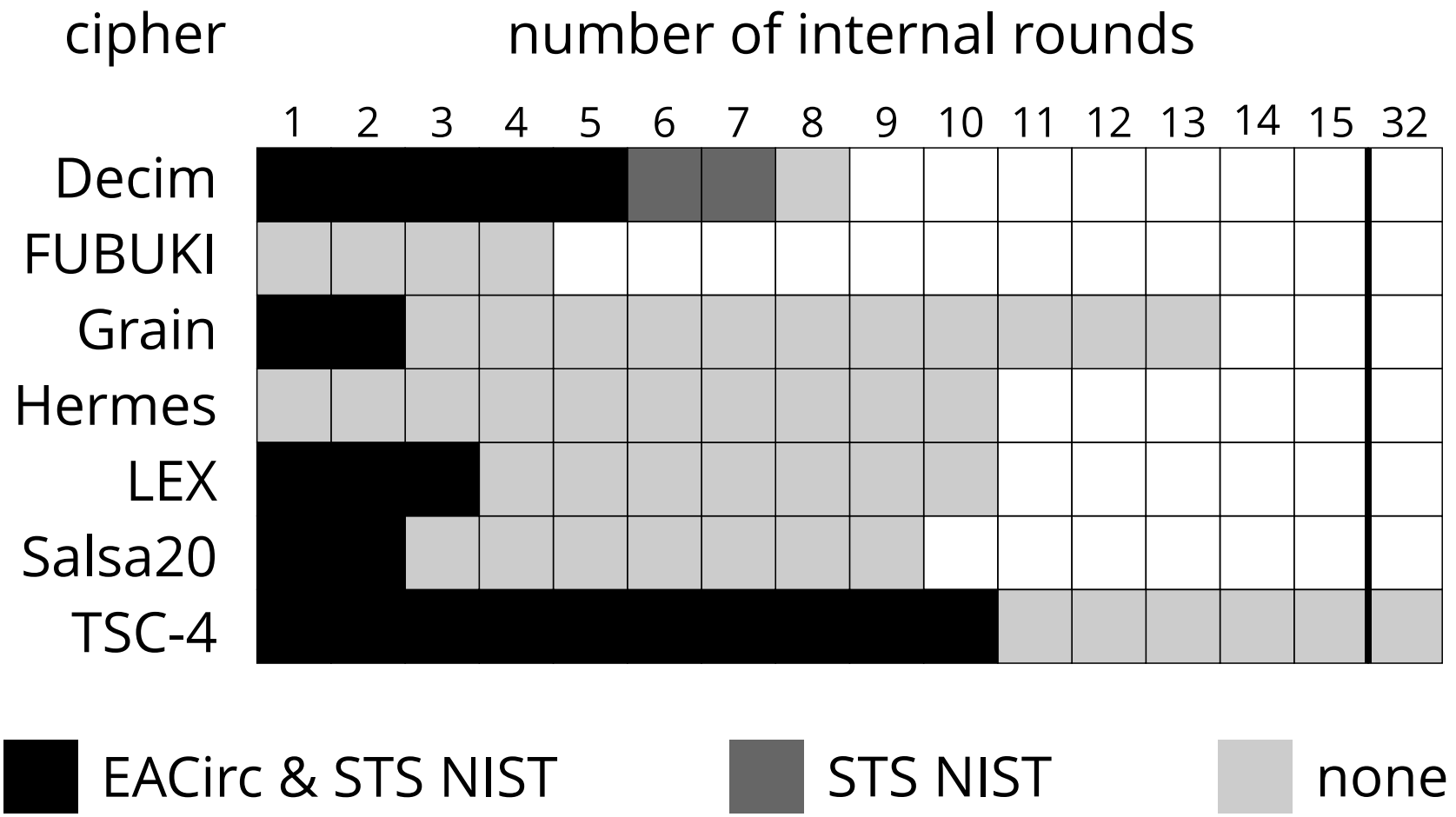
b) 18 SHA-3 hash function candidates



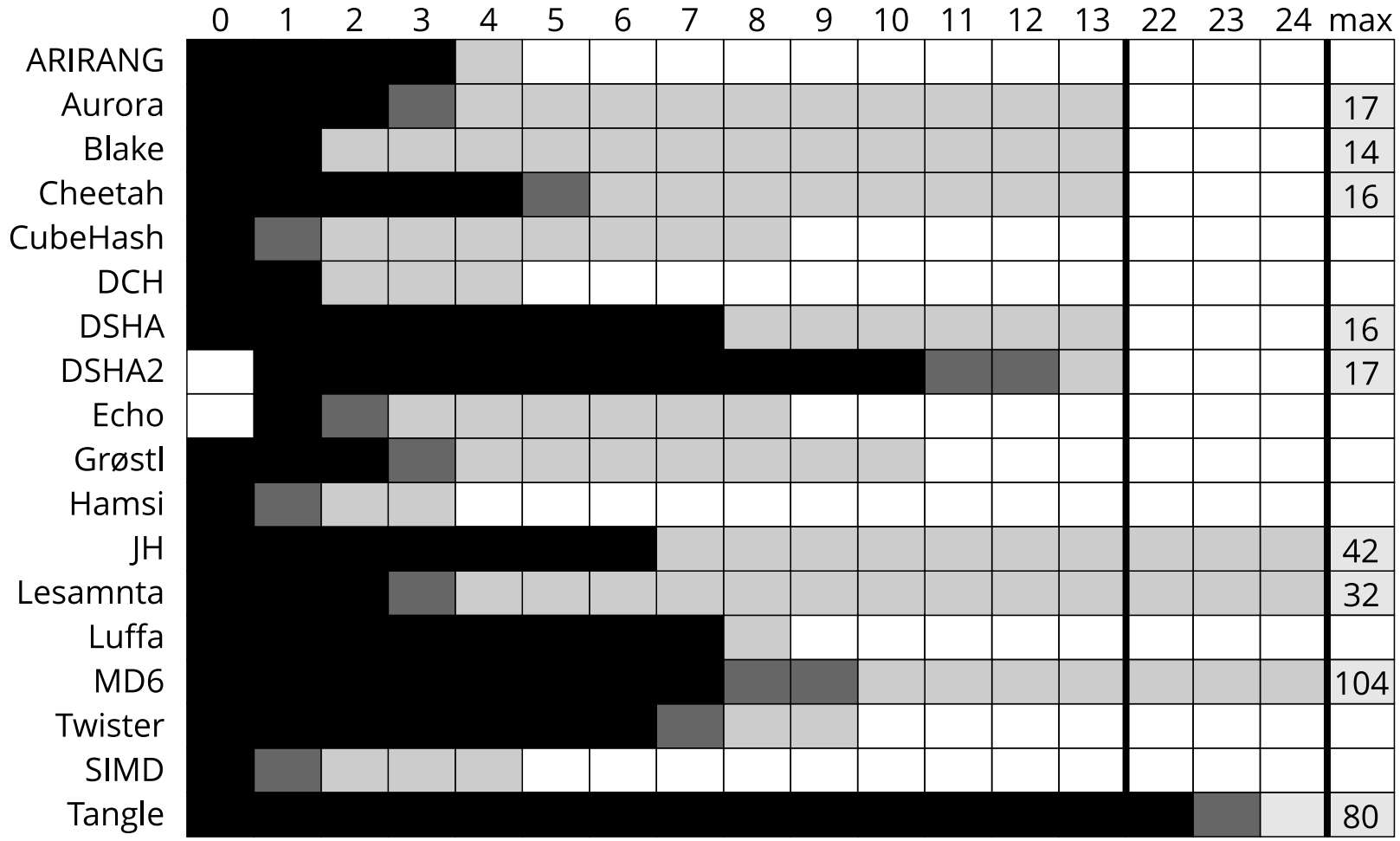
c) random data



eStream – achieved results



SHA-3 – achieved results



Future work

- precise statistical interpretation of results
- processing longer inputs
- byte-code dumps in nodes

EACirc – conclusions

automated

universal

less data needed

occasionally worse than statistical tests

local patterns only

comparably slower

Thank you!

Questions are welcome.