

COM-402 exercises 2025, session 5:

Language Security

Exercise 5.1

Explain type safety and memory safety.

Exercise 5.2

Is type safety necessary to reduce security vulnerabilities?

Exercise 5.3

Why would a software developer prefer to use a safe programming language? Why would a developer prefer an unsafe programming language?

Exercise 5.4

Does language safety impose a burden on a software developer?

Exercise 5.5

What are the advantages and disadvantages of the memory reclamation techniques discussed in the lecture?

Exercise 5.6

Give examples for violations of spatial and temporal memory safety. Explain how modern programming languages prevent such violations.

Exercise 5.7

Explain static/dynamic typing. What are their advantages and disadvantages?

Exercise 5.8

Compare and contrast dynamic typing and loose (weak) typing.

Exercise 5.9

Do modern programming languages provide full guarantee for thread safety?

Exercise 5.10

Explain the principle of least privilege, sandboxing, and compartmentalization in your own words. Show how they relate to each other.