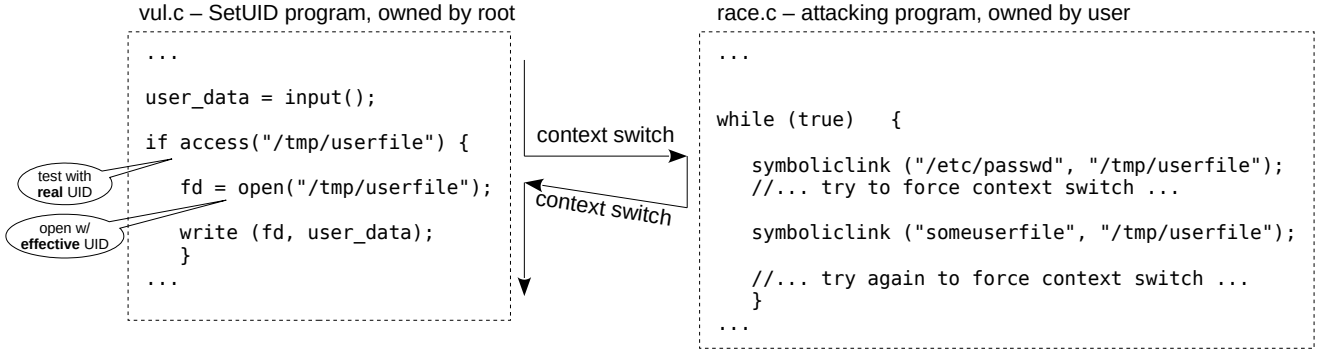
Race Condition Vulnerability Lab

General problem

- Race conditions:
  - final result depends on timing
  - solution: guarantee atomic serialization of operations
  - e.g. concurrent withdrawal of funds:
    - atomic: 1st, get balance; 2nd, withdraw possible amount
- In general, for security, guarantee:
  - atomicity of Time-Of-Check To Time-Of-Use (TOCTTOU)

Vulnerability demonstration: Unix

- any user can create files (and symbolic links) in `/tmp`
- use a root SETUID program that reads user file in `/tmp` and acts on it (e.g writes to it)
- change file in `/tmp` to symbolic link to system file (e.g. `/etc/passwd`)
  - try to do so between system testing of user file and system changing it to link
  - if this succeeds, system target will be compromised



Software bug

- CWE-61: UNIX Symbolic Link (Symlink) Following [1]
  - «*The software, when opening a file or directory, does not sufficiently account for when the file is a symbolic link that resolves to a target outside of the intended control sphere.*
    This could allow an attacker to cause the software to operate on unauthorized files.»

1 remember: CWE - Common Weakness Enumeration «has to do with the vulnerability – not the instance within a product or system»
CVE - Common Vulnerabilities and Exposures «has to do with the specific instance within a product or system – not the underlying flaw»