

iCalendar parser

Team project

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Format

- **iCalendar**
- RFC 5545
- for exchanging events, tasks, ... on the Internet
- text format
- tree structure similar to XML
- example:

```
BEGIN:VCALENDAR
VERSION:2.0
PRODID:-//hacksw/handcal//NONSGML v1.0//EN
BEGIN:VEVENT
UID:19970610T172345Z-AF23B2@example.com
DTSTAMP:19970610T172345Z
DTSTART:19970714T170000Z
DTEND:19970715T040000Z
SUMMARY:Bastille Day Party
END:VEVENT
END:VCALENDAR
```

Format

- basic elements:
 - **component** (like XML element)
 - **property** (like XML element without children)
 - **property parameter** (like XML attribute)
- components contain properties + other components
- properties have name and value
- properties can have parameters (name=value pairs)
- iCalendar stream = 1 or more VCALENDAR components ("iCalendar objects")
- the standard defines what elements can occur inside which element
- there can also be extension/IANA-registered elements (our parser doesn't support this)

Parser

- language: C++11, no extra libraries
- recursive descent parser
- two stages:
 - ① parsing of general structure (output: tree of components, properties, parameters)
 - ② validating correct structure, parsing property/parameter values (output: object model)
- + easy to write the parser
- – inefficient (if an error is in the semantics, the whole iCalendar object is loaded into memory before being rejected in the second stage)

Tools

- **cppcheck**
 - detected some typos
 - warned about implicit constructors with a single argument
 - some false positives
- **Coverity**
 - offers free analysis of public GitHub repositories
 - detected uninitialized values in empty constructors
 - also detected some issues in the standard library :)
- **zzuf** (binary fuzzer) – detected a bug in UTF-8 handling
- **valgrind (MemCheck), radamsa** – we were not able to find any issues
- all detected issues were fixed, false positives were documented in the code