Advanced Programming

Talk 8: Language Binding

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Overview

- What and why?
- Binding examples
- Hands-on: Interfacing C++ on Matlab
- Conclusion

First week at TUM

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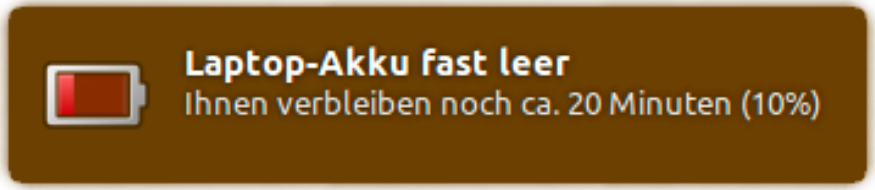
Hmm.. my laptop ran out of charge.



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- Need:
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  - Outdated software for large projects (maintainability and extentability)

Example: SWIG

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- "Simplified Wrapper and Interface Generator"
- Open-source tool connecting C/C++ code with:
  - Scripting languages: Lua, Perl, PHP, Python ..
  - XML
  - Lisp
  - Other

Example: Extend Python in C/C++

```
#include <python.h>
```

- Takes reference to self and to list of arguments
- Objects refered to as `PyObject`

Example: Interfacing C++-Python

- Boost libraries: hipster C++
- Binaries for BLAS, pseudorandom numbers, multithreading, img-proc, unit-testing ..
- You can find a nice tutorial here.

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- Use the `mex` functionality!
  - "`m`atlab `ex`ecutable"
  - compiles and links C, C++, or Fortran source files into binary file **callable from Matlab**

Interfacing C++ on Matlab (1)

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- Create `.cpp` file with desired function name
- Instead of `main()`, use this function structure:

```
void mexFunction (
        int nlhs,
        mxArray *plhs[],
        int nrhs,
        const mxArray *prhs[]
);
```

Interfacing C++ on Matlab (2)

- On Matlab, call

  ```
  mex functionName.cpp
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- Generates a `.mexa64` file (arch-dependent!)
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- More info here.

That's all :)

Questions?