Sistemsko programiranje - C preschool

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Overview

What is C?

- C is the most used programming language in system programming.
- C syntax is similar/same as Java's,
- Actually it was the other way around, Java's syntax was taken after C/C++,
- My personal opinion: C is a nice language:)

The shortest program in C

```
void main(void){
}
```

The shortest program in C - variant (ANSI C)

```
int main(void){
return(0);
}
```

The shortest program in C - variant

```
main(){
}
```

Hello in C

```
main(void){
   printf("Hello!");
   return(0);
}
```

Compile

- Write/copy the example
- Compile the example with *gcc*

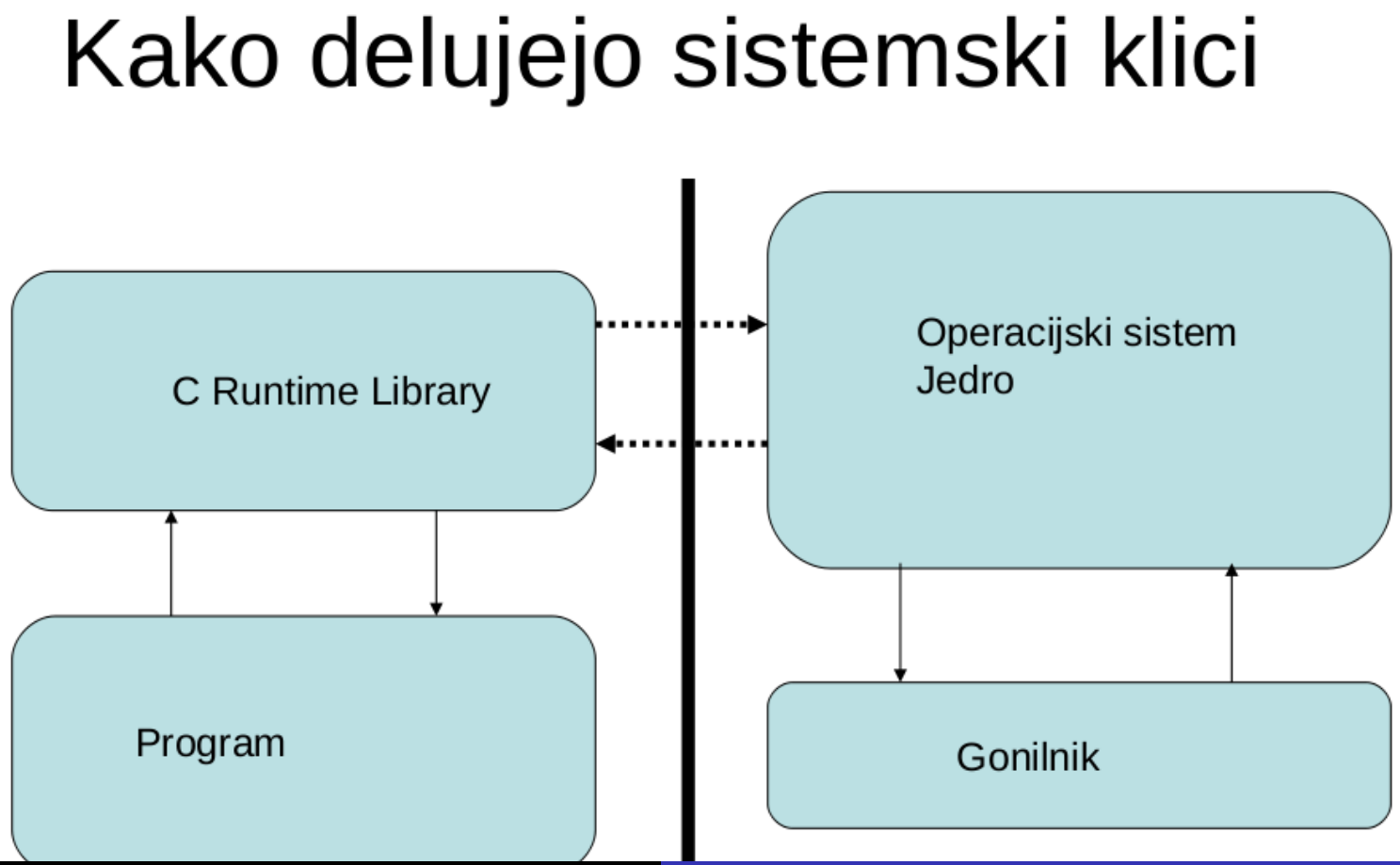
Make

- Control over big source projects and more...
- Examples:
  - Big project: `Makefile.apertium`
  - Titles: `MakefileTitles`
  - Small project: `MakefilePrimer1`

System calls

- Standard C Library
- Application Programming Interface (API) to System-Calls

How do system calls work?



Importantt file functions

- `int open( char *pathname, int flags );`
- `int read( int fd, void *buf, size_t count );`
- `int write( int fd, void *buf, size_t count );`
- `int close( int fd );`

man

- hardcore interface, still usable,
- Example:
  `man 2 open`

Function open

- `#include <fcntl.h>`
- `int open( const char *pathname, int flags );`
- Translates path name into file descriptor,
- file-descriptor is a non-negative integer,
- Used as a file-ID in functions:
- flags are symbolic constants:
  `O_RDONLY, O_WRONLY, O_RDWR`

Function read

- `#include <unistd.h>`
- `int read( int fd, void *buf, size_t count );`
- Tries to read count bytes,
- The read data is saved into variable ‘buf’ (memory-buffer),
- Returns number of read bytes,
- Returns -1 if there was an error,
- End of file (EOF) was reached if the return value is 0.

Function write

- `#include <unistd.h>`
- `int write( int fd, void *buf, size_t count );`
- Tries to write up to count bytes,
- Bytes are taken from variable ‘buf’ (memory-buffer),
- Returns number of written bytes,
- Returns -1 if there was an error,
- No data was written if it returns 0.

Blocking mode

- Some extra attention should be used in these examples for reading files - devices,
- Function `read()` does not return 0, unless there the (EOF) was reached,
- Devices should have data ready very soon,
- On multiprogrammin OS waiting is a big no-no!