Project 2
Helper Functions, Common Issues and Tips

CSE 421/521 - Operating Systems

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Helper Functions

Helper Functions

- strtok_r
  - Example:
    - char *placeholder, *token;
    - for (token = strtok_r (file_name, " ", &placeholder); token != NULL; token = strtok_r (NULL, " ", &placeholder)) { …. }
    - *file_name is your input

Helper Functions

- memcpy
  - **esp is your stack pointer
  - *token is your token you got from strtok_r
  - memcpy(*esp, token, strlen(token)+1)

Helper Functions

- hex_dump(uintptr_t ofs, const void *buf_, size_t size, bool ascii)
  - Use as much as possible
  - Example:
    - hex_dump(PHYS_BASE - 128, PHYS_BASE - 128, 128, true);
  - Use the same address pointer as the offset (as shown in above example)
  - Keep the last argument (ascii) true

Common Issues

Issues

Issue

- Kernel panics on running pintos -p *file* -- -q

Possible Reasons and Solutions

- File size should not exceed 14 characters
  - pintos –p ../../examples/echo -a echo -- -q
- File system cannot contain more than 16 files
- File system may not have enough space
- Format the file system (pintos –f)

Issues

Issue

- On running pintos -p ../*file* --, *file* isn't copied

Possible Reasons and Solutions

- Run pintos -p ../*file* -a *file* -- instead
- Run pintos -q ls to list all the files in the file system

Issues

Issue

- Page fault on running user programs

Possible Reasons and Solutions

- Argument passing not implemented correctly
  - The basic C library for user programs tries to read *argc* and *argv* off the stack

Issues

Issue

- On running user programs just “system call!” is printed

Possible Reasons and Solutions

- Implement system calls
  - exit() executed by all programs
  - printf() uses the write() system call

Tips

Debugging User Programs

- Mostly similar to Project 1
  - On first terminal:

    $ pintos --gdb -- run alarm-multiple
  - In another terminal

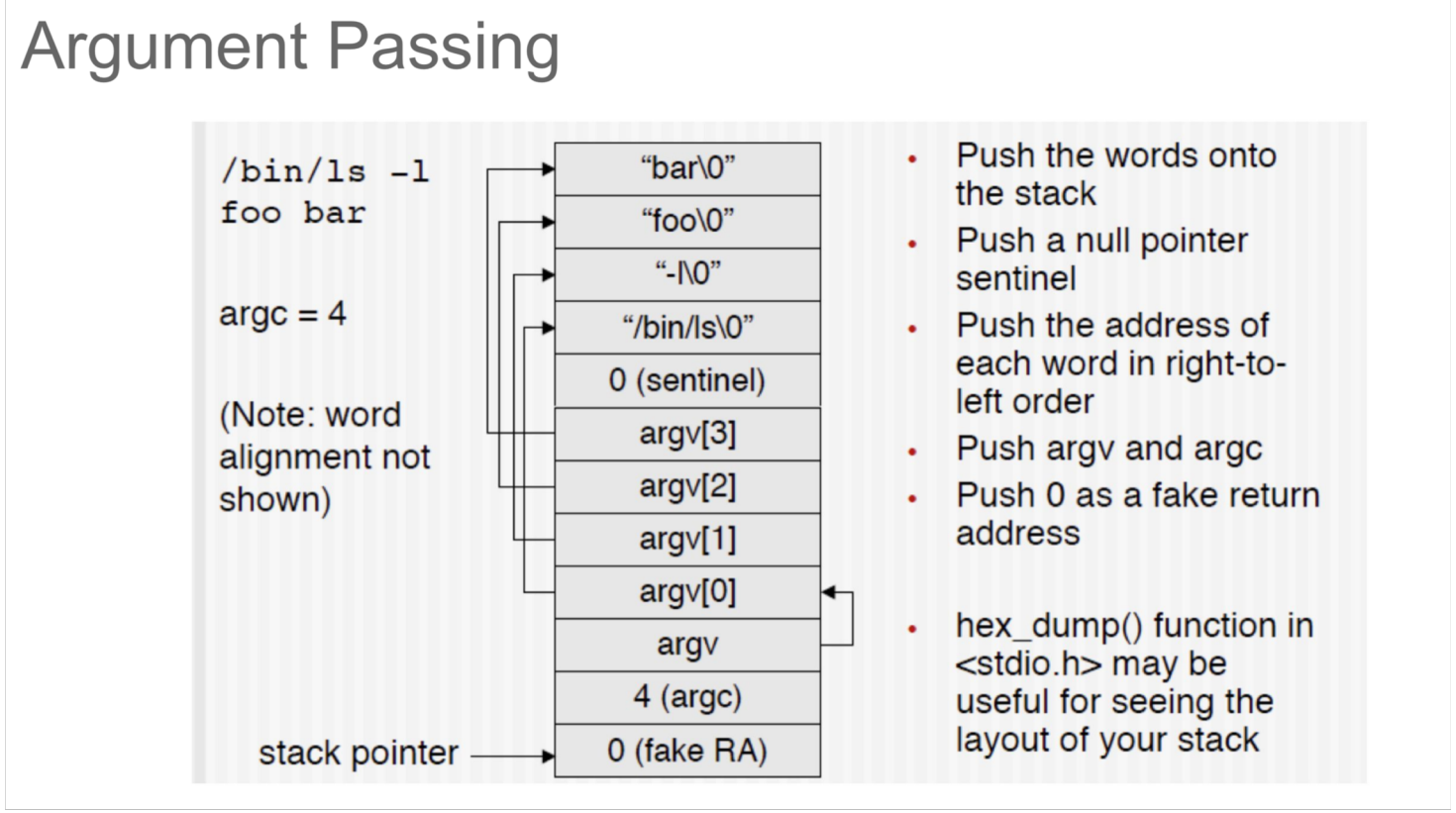
    $ pintos-gdb kernel.o
    - (gdb) target remote localhost:1234 OR
    - (gdb) debugpintos

Debugging User Programs

- New macro: **loadusersymbols**
- Example: (gdb) **loadusersymbols tests/userprog/exec-multiple**
- **Possible Issue:** A name that appears in both the kernel and the user program will actually refer to the kernel name.

Tips

- Order of arguments stored does not matter



Tips

- Try deleting filesys.dsk if you haven’t in a while
- Then run the setup commands again:
  - pintos-mkdisk filesys.dsk --filesys-size=2
  - pintos -f -q
  - pintos -p ../../examples/echo -a echo -- -q
  - pintos -q run ‘echo x’

Tips

- Argument passing can be implemented in a lot of places, but the recommended place is setup_stack()
  - Modification needed to get file_name in setup_stack():
    - Change function signature to add a second argument

- When running tests, remove all printf() statements

- Make sure to free any data structures you assign memory for using free(…);

Q&A