

POWER Block Course

Assignment 1: First Steps on AIX

(Submission deadline: 04.11.2016, 23:59 CET)

General Rules

The assignment solutions have to be submitted at:

<https://www.dcl.hpi.uni-potsdam.de/powersubmit/>

Our automated submission system is intended to give you feedback about the validity of your file upload. A submission is considered as accepted if the following rules are fulfilled:

- You did not miss the deadline.
- Your file upload can be decompressed with a zip / tar decompression tool.
- Your program runs without expecting any kind of keyboard input or GUI interaction.

If something is wrong with your submission, you will be informed via email (console output, error code). Re-uploads of corrected solutions are possible until the deadline.

All tasks must be submitted accordingly in order to pass the assignment. You are expected to explain your solution in the oral exam.

Assignment 1

The first assignment covers the first steps of using the IBM AIX operating system. In the plenum we showed you how to login and use basic commands on AIX. In this exercise we want you to gain deeper knowledge of the operating system.

Your final submission for the programming exercises must compile and work properly on little-endian and big-endian systems, running Ubuntu or AIX with the GCC and XLC compilers.

Task 1.1: System properties

Please log into the system and answer the following questions. The DNS-name `aix02.fsoc.hpi.uni-potsdam.de` / IP-Address is `192.168.42.56`. You can login with your FSOC account. We suggest you have a look at *the IBM AIX commands you should not leave home without*, which you find at: http://www.ibm.com/developerworks/aix/library/au-aix_cmds/index.html . As shown in the plenum session the tools you can use are: `lsdev`, `smit lsdev`, `lsattr`, `lscfg`, `lssrad` and `lparstat`. You are also encouraged to use `hwloc` (<https://www.open-mpi.org/projects/hwloc/> , use version 1.10).

- a) Which shell are you using by default?
- b) How much Memory (RAM) does your system have?
- c) What is the capacity of the physical volume `hdisk0`?
- d) When was the system started?
- e) How many processors (logical, physical, total) does your system have?
- f) Which SMT Mode is currently activated for the processors?
- g) What is the *systemid* of the AIX system? (hint: device `sys0`)
- h) In which version is the RSCT Resource Monitoring and Control installed?

Submit a .txt file with the answers to the questions. Also tell us how you obtained the information (e.g. tools used).

Task 1.2: Hello Endianness

Develop an C/C++-based command line tool determine which Endianness the system uses and print out the following String accordingly:

```
Hello Big Endian World!
```

or

```
Hello Little Endian World!
```

Please submit a tar.gz archive containing a single .c file together with a Makefile.

Make sure your program compiles with GCC (/opt/freeware/bin/gcc) as well as XLC (/opt/IBM/xlc/13.1.3/bin/xlc). Use the environment variable \$(CC) for the selection of the compiler in your makefile.

Task 1.3: Porting from Linux to AIX

In this task we will provide you with an application which compiles and runs fine on Ubuntu Linux (little endian). But porting it to AIX (big endian) you will experience several problems.

Please fix these issues in such a way that your final program compiles and runs fine on little-endian Linux and big-endian AIX. Submit a tar.gz archive containing all source code files and your Makefile.

Your final program should read a bitmap file consisting of a BMPv5 file header¹ and RGBA-pixel data, and than negate the color channels.



Hint: For XLC you might want to use `-qlanglvl=extc1x` as language standard.

¹ [https://msdn.microsoft.com/en-us/library/windows/desktop/dd183381\(v=vs.85\).aspx](https://msdn.microsoft.com/en-us/library/windows/desktop/dd183381(v=vs.85).aspx)