

Computer Systems for AI-programmers
baiCSAI3, Spring 2010
Lab Assignment: extracting CPU via assembly calls
Assigned: Week 5
Due: Week 6, Wednesday February 10, 17:00 after class

Arnoud Visser (A.Visser@uva.nl) is the lead person for this assignment. Steijn Kistemaker (skistema@science.uva.nl) will assist you on Thursday morning.

1 Introduction

This assignment deals with using assembly from a higher-level language (in this case C). Assembly can be used if you want to write really fast code or when you need direct access to the processor. This assignment is about the later case. The goal of this assignment is to print the family name and clock speed of a IA32 processor, by querying the processor via two assembly instructions.

2 Compiler and assembler versions

Before you start with this assignment, make sure that you use the correct compiler and assembler:

```
/home/cs_ai/packages/gcc-2.95.3/bin/gcc
```

```
/home/cs_ai/packages/binutils-2.17/bin/as
```

If not, follow the instructions on the page <http://staff.science.uva.nl/~arnoud/onderwijs/CS/intro/softpkg.html>.

3 Logistics

You may work in a group of up to two people in solving the problems for this assignment. The only “hand-in” will be electronic. Any clarifications and revisions to the assignment will be posted on the course Web page.

4 Hand Out Instructions

Start by copying `cpuinfo-lab-handout.tar.gz` to a protected directory in which you plan to do your work. Then give the command: `tar zxvf cpuinfo-lab-handout.tar.gz`. This will cause a number of files to be unpacked into the directory. The only C-file you will be modifying and handing in is `cpuinfo.c`. The `clock.c` is a module that provides you the function `mhz()`. This module can measure the clock speed accurately for IA32 machines, because it access the cycle counter directly via the assembly-instruction `rdtsc`. No `Makefile` is given, so you have to link this module yourself.

Looking at the file `cpuinfo.c` you’ll notice a C structure `team` into which you should insert the requested identifying information about the one or two individuals comprising your programming team. **Do this right away so you don’t forget.**

5 Infrastructure

You can test the correctness of your implementation by comparing your output with the Linux-file `/proc/cpuinfo`.

Note: The only source file you will be modifying is `cpuinfo.c`.

Team Information

Important: Before you start, you should fill in the struct in `cpuinfo.c` with information about your team (teamname, team member names and email addresses). This information will be requested for all Computer Systems Labs. Use a short teamname (3 to 8 characters), so that you can use this name to precede all your hand-ins.

Coding Rules

You may write any code you want, but take care of the following:

- It must be in ANSI C. I don't want any complaints of the compiler.
- Follow the recommendations for building large programs at http://staff.science.uva.nl/~dick/education/Computing_skills/large-programs/.
- Follow the general conventions on Makefiles at <http://www.gnu.org/software/make/manual/>.
- Follow the rules for readable code at <http://staff.science.uva.nl/~dick/education/prak/codconv/>.
- If you break the rules, conventions or recommendations, don't be shy, and explain your design decisions.
- If you think that you make a mark (e.g. you have tested your code on a 286), claim that mark. The lead person of this assignment sees in a short time a lot of code, so make sure that he looks at the right spots.

You should only modify code in `cpuinfo.c`.

Evaluation

Your solution will be tested on three different machines. A correct description of each of the machines will count for three times 20% of your grade. The other 40% will be based on the style of your code and packaging.

6 Hand In Instructions

When you have completed the lab, you will hand in one file, `teamname-v1-cpuinfo.tgz`, that contains your solution. Here is how to hand in your solution:

- Make sure you have included your identifying information in the team struct in `cpuinfo.c`.
- Make sure your package is complete and working.
- Remove any extraneous print statements.
- Copy the package to the handin directory by typing

```
cp teamname-v1-cpuinfo.tgz /home/cs_ai/cpuinfo/lab/handin2010/
```

- After the handin, if you discover a mistake and want to submit a revised copy, increment the version number, and type
`cp teamname-v2-cpuinfo.tgz /home/cs_ai/cpuinfo/lab/handin2010/`
Keep incrementing the version number with each submission.

Good luck!