Lab 6: Instruction Selection, Liveness Analysis, Register Allocation, and Put it all together!

[Update 2018-12-24 09:40 AM]

To avoid the size inconsistency between pointers and array elements, please modify array element size from sizeof(int) to sizeof(long) in file **runtime.c** at line 9. That is:

- int *a = (int *)malloc(size*sizeof(int));

+ int *a = (int *)malloc(size*sizeof(long));

Description

In this lab, your goal is to make your compiler generate working code that runs on x86-64 platform.

The file runtime.c is a C-language file containing several external functions useful to your Tiger program. These are generally reached by externalCall from code generated by your compiler. You may modify this as necessary.

Write a module main.c that calls on all the other modules to produce an assembly language file prog.s for each input program prog.tig. This assembly language program should be assembled (producing prog.o) and linked with runtime.o to produce an executable file.

In your generated code, you should do what you can to **avoid unnecessary stack accesses** (push and pop), which means placing as many variables as possible in registers by **escape analysis** in register allocation phase. Otherwise, you will NOT get the full scores!

Notice: Before you start this lab, you should carefully read the chapter 8 to 12 of the textbook. And if you have any question about this lab, feel free to contact Haoyu Li, who is the teaching assistant responsible for lab 6.

Environment

You can download the lab environment here, and then decompress it to your current directory by the following command.

```
shell% tar -xzvf lab6.tar.gz
```

Grade Test

The lab environment contains a grading script named as **gradeMe.sh**, you can use it to evaluate your code, and that's how we grade your code, too. If you pass all the tests, the script will print a successful hint, otherwise, it will output some error messages. You can execute the script with the following commands.

```
shell% ./gradeMe.sh
shell% ...
shell% Your score: 100 #If you pass all the tests, you will see these messages.
```

Handin

The deadline of this lab is on Friday 12:00 AT NOON, Jan. 4, 2019, and no delay is allowed!

Afte you have passed the grade test, you need first package your code and rename the file lab6_xxx.tar.gz to lab6_[your student ID].tar.gz. For example, if your student ID is 516037900000, then the file name should be lab6_516037900000.tar.gz, and no any other letters are included. You can use the following commands to finish this step.

```
shell% make handin #This command will do the packaging for you, generating a file named as lab6_xxx.tar.gz
shell% mv lab6_xxx.tar.gz lab6_516037900000.tar.gz
```

In the end, you need to submit the renamed tar.gz file to ftp://haoyu.li:public@public.sjtu.edu.cn/upload/lab6 before the deadline.

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