IIT PALAKKAD

Indian Institute of Technology Palakkad
Department of Computer Science and Engineering

CS3140 Compiler Design Laboratory

January – May 2024

Notes of April 5, 2024 Lab Session

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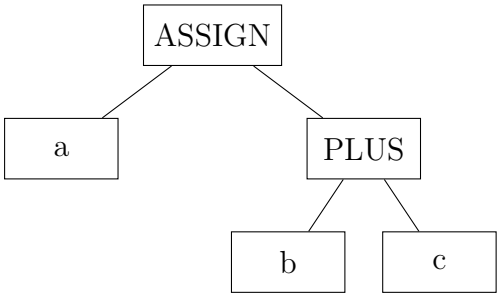
1. `mips-linux-gnu-gcc-10 file.c -S -o file.s`
   The above command compiles the file.c and outputs the assembly code in MIPS Architecture

2. `mips-linux-gnu-gcc-10  file.s -o file.out`
   This command compiles the assembly code and outputs the executable which can be executed on a MIPS-Architecture based machine

3. `qemu-mips -L /usr/mips-linux-gnu/ file.out`
   This command runs the executable using the MIPS emulator

We have to create a MIPS architecture based assembly code from the generated AST which can be done through traversal of AST and pattern matching the contents of node and outputting the corresponding assembly code

For example : If the statement is a = b + c The AST would look like the following



The corresponding assembly code would be

```
lw      $1, b
lw      $2, c
add     $1, $1, $2
sw      $1, a
```

The below contents would be the same for almost all files

```
.file   1 "file.c"
        .section .mdebug.abi32
        .previous
```

```
        .nan    legacy
        .module fp=xx
        .module nooddspreg
        .abicalls
        .text
        .section        .bss,"aw",@nobits
# ...
        .globl  main
        .set    nomips16
        .set    nomicromips
        .ent    main
        .type   main, @function
main:
        .frame  $fp,32,$31      # vars= 0, regs= 2/0, args= 16, gp= 8
        .mask   0xc0000000,-4
        .fmask  0x00000000,0
        .set    noreorder
        .set    nomacro
# ...
        lui     $28,%hi(__gnu_local_gp)
        addiu   $28,$28,%lo(__gnu_local_gp)
        .cprestore      16
```

`.align x` aligns the data by 2^x bytes
`.space x` gives space of x bytes to the variable