

# COSE222, COMP212, CYDF210 Computer Architecture Assignment #1

**No late turn-in accepted**

1. Install the MIPS cross-compiler posted on the class web ([MIPS cross-compiler with Eclipse](#)).
2. Using the C program in Table 1, go through the compilation steps we studied in the class. After each step, print out the outcome.

- Native compilation to generate x86 machine code: Open a shell using “Cygwin Terminal (for example)” in Cygwin, and print out the outcome after each of the following steps
  - Preprocessing
  - Compilation
  - Assembler (assembler output is binary (not human-readable), so use `objdump` for disassembling the object code and print out the `objdump` outcome)
- Cross-compilation to generate MIPS machine code: Use the Eclipse environment you set up and print out the outcome after each of the following steps
  - Preprocessing (use `mips-elf-cpp` for preprocessing)
  - Compilation (use `mips-elf-gcc` for compilation)
  - Assembler (use `mips-elf-as` for assembling, then use `mips-elf-objdump` for disassembling the object code)
  - Linker (use `mips_elf-ld` for linking, then use `mips-elf-objdump` for disassembling the binary)

(For the MIPS cross-compilation, please refer to an example ([assembly\\_c\\_mix\\_example](#)) in the cross-compilation environment you set up. 1. `Makefile` contains all the information for compilation. 2. Replace `jal addition` in `testvec.s` with `jal compare`. It is because the function name in Table 1 is `compare`)

Table 1. C program for assignment #1

```
#define min(x,y) ((x) < (y) ? (x) : (y));

int compare(int b, int c)
{
    int a;
    a = min(b, c);
    return a;
}
```

**What and How to submit:**

Submit (Upload) pdf to Blackboard. The pdf should have the following contents;

1. Explanation of the role of `Makefile` in Eclipse project
2. Outputs of each compilation step in the native compilation
3. Outputs of each compilation step in the cross-compilation for MIPS

**Note: This is an individual assignment. You are welcome to discuss, but DO NOT COPY solutions. If you are found to copy solutions from others or slightly modify the solutions from others, both of you will be given 0 credits.**