Topics

- Review all previous material up to Exam I
- Procedures
  - Parameter Passing
  - Stack frames
  - Recursive procedures (Problem Set 3)
- Data Representation
  - Signed and unsigned integers
  - Floating point numbers
    - Single precision
    - Double precision
    - Converting between decimal scientific notation and IEEE 574
  - Arrays
    - One dimensional
    - Two dimensional
    - Multi-word objects
- Easy I simulator implementation

NOTE: The material on the Intel Pentium processor will be tested on the final exam.

Practice Problems

1. Write a recursive procedure to compute and return the greatest common divisor (GCD) of 2 integer arguments. First write the procedure in a HLL and then compile the HLL code to MIPS assembly. The GCD can be defined recurrently as:

   a. \( \text{GCD}(a, b) = b \) if \( b \) divides \( a \)
   b. \( \text{GCD}(a, b) = \text{GCD}(b, r) \) otherwise, where \( r = a \mod b \)
2. Write a procedure called `precision()` with no arguments. The procedure must return the smallest floating point number that can be added to 1 such that the result of the sum is different from 1.

3. Write a procedure `sin(x)` that takes one float argument representing an angle in radians. The procedure should return the approximated floating point value of `sin(x)` by computing the sum of a Taylor series. First write the procedure in a HLL and then write it in MIPS assembly language.

4. Write procedures that take a one-dimensional array of integers `a` and its length and perform the following operations:
   a. Multiply the array by a scalar
   b. Compute the sum of the elements of the array
   c. Sort the array increasingly

5. Repeat problem 3 this time using arrays of double precision floating point numbers.

6. Write a procedure `mmult(a, b, c, n)` that takes as arguments three square matrices `a`, `b`, and `c` with common length `n`. The procedure should compute the matrix product of `a` and `b` and store the result on matrix `c`. First write a HLL version of `mmult` and then hand-compile it to MIPS assembly language.

7. All the problems on Chapters 3 and 4 of Patterson and Hennessy Computer Organization and Design.

**REMINDER**

We will have exam 3 next Monday April 22 from 6-8 PM in S-113.