

## Homework 2 of CSCE 212

- Consider two different implementations of the same ISA. The four classes of instructions are A,B,C and D. Refer to following table for the data required.

	Clock Rate	CPI A	CPI B	CPI C	CPI D
P1	3 GHz	1	3	4	2
P2	4 GHz	4	5	6	2

Given a program with 10% of A instructions, 20% of B instructions, 30% of C instructions and 40% of D instructions

- Which implementation of P1 and P2 is faster?
  - What is the global CPI of each implementation?
  - If the program has  $10^4$  instructions, find the execution time on each implementation.
- Refer to the following table for the data required.

	Arith	Store	Load	Branch
Instructions for a program	500	50	100	100
CPI	1	5	5	2

- Calculate execution time of a program on a 2 GHz processor.
- Find global CPI of the program.
- If number of load instructions can be reduced by one-half, what is the speed up and CPI?
- If number of store and arithmetic instructions can be reduced by one-half, what is the speed up and CPI?

- Write MIPS code to implement a leaf procedure for the following C function:

```
int leaf_procedure(int x, int y)
{
    int i, a;
    a=x+y;
    i=1;
    while(i<=10)
    {
        a=a+i;
        i++;
    }
    return a;
}
```

Assume that the variables `x` and `y` are passed from argument registers `$a0` and `$a1` respectively. The returned value should be stored in register `$v0`. Note that you need to use stack to store any other registers if you use them in this procedure.

- Convert the decimal number  $-27.0625$  to equivalent IEEE 754 FP representation (single precision). Show the final result in hexadecimal format and your answer must include the steps.
- Which decimal number does `0xC0A80000` (IEEE 754 FP single precision) represent? Your answer must include the steps.