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ECE 154A

10/27/23

Lab 3 Report

Number of hours spent on lab

I spent about 6 hours on this lab.

`sort.s`

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counting_sort:
    addi t0, a3, 1       # t0 = maxnumber + 1;
    slli t0, t0, 2       # t0 *= 4;

    sub sp, sp, t0       # int count[maxnumber + 1];
    addi t1, zero, 0     # n = 0;

for1:
    bgt t1, a3, done1    # for (n = 0; n <= maxnumber; n++) {
    slli t0, t1, 2       #   t0 = n * 4;
    add t0, sp, t0       #   t0 = &count[n];
    sw zero, 0(t0)       #   count[n] = 0;
    addi t1, t1, 1       #   n = n + 1;
    j for1               # }

done1:
    addi t1, zero, 0     # n = 0;

for2:
    bge t1, a2, done2    # for (n = 1; n < numkeys; n++) {
    slli t0, t1, 2       #   t0 = n * 4;
    add t0, a0, t0       #   t0 = &keys[n];
    lw t2, 0(t0)         #   t2 = keys[n];
    slli t2, t2, 2       #   t2 = t2 * 4
    add t2, sp, t2       #   t2 = &count[keys[n]];
    lw t3, 0(t2)         #   t3 = count[keys[n]];

    addi t3, t3, 1       #   t3 = count[keys[n]] + 1;
    sw t3, 0(t2)         #   count[keys[n]] = t3;
    addi t1, t1, 1       #   n = n + 1;
    j for2               # }
```

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done2:
    addi t1, zero, 1     # n = 1;


for3:
    bgt t1, a3, done3    # for (n = 1; n <= maxnumber; n++) {
    slli t0, t1, 2       #   t0 = n * 4;
    add t0, sp, t0       #   t0 = &count[n];
    lw t2, 0(t0)         #   t2 = count[n];
    addi t3, t0, -4      #   t3 = &count[n - 1];
    lw t4, 0(t3)         #   t4 = count[n - 1];
    add t2, t2, t4       #   t2 = t2 + t4;
    sw t2, 0(t0)         #   count[n] = t2;
    addi t1, t1, 1       #   n = n + 1;
    j for3               # }


done3:
    addi t1, zero, 0     # n = 0;


for4:
    bge t1, a2, done4    # for (n = 1; n < numkeys; n++) {
    slli t0, t1, 2       #   t0 = n * 4;
    add t0, a0, t0       #   t0 = &keys[n];
    lw t2, 0(t0)         #   t2 = keys[n];
    addi t5, t2, 0       #   t5 = keys[n];
    slli t2, t2, 2       #   t2 = t2 * 4
    add t2, sp, t2       #   t2 = &count[keys[n]];
    lw t3, 0(t2)         #   t3 = count[keys[n]];
    addi t4, t3, -1      #   t4 = count[keys[n]] - 1;
    slli t4, t4, 2       #   t4 = t4 * 4
    add t4, a1, t4       #   t4 = &output[count[keys[n]] - 1];
    sw t5, 0(t4)         #   output[count[keys[n]] - 1] = keys[n];
    addi t3, t3, -1      #   t3 = count[keys[n]] - 1;
    sw t3, 0(t2)         #   count[keys[n]] = t3;
    addi t1, t1, 1       #   n = n + 1;
    j for4               # }


done4:
    addi t0, a3, 1       # t0 = maxnumber + 1;
    slli t0, t0, 2       # t0 = t0 * 4;
    add sp, sp, t0       # delete count[maxnumber + 1];
    jr ra
```