

Ve370 Introduction to Computer Organization

Project 1

PROJECT DESCRIPTION

Develop a MIPS assembly program that operates on a data segment consisting of an array of 32-bit signed integers. In the text (program) segment of memory, write a procedure called `main` that implements the `main()` function and as well as procedures for other subroutines described below. Assemble, simulate, and carefully comment the file. Screen print your simulation results and explain the results by annotating the screen prints. You should compose an array whose size is determined by you in the `main` function and is not less than 20 elements.

```
main() {
    int size = ...; //determine the size of the array here
    int PosCnt, NegCnt, ZeroCnt;
    int testArray[size] = { 1, 13,
        ... //compose your own array here
    };
    PosCnt = countArray(testArray, size, 1);
    NegCnt = countArray(testArray, size, -1);
    ZeroCnt = countArray(testArray, size, 0);
}

int countArray(int A[], int numElements, int cntType) {
    /*****
    * Count specific elements in the integer array A[] whose size is      *
    * numElements and return the following:                                *
    *                                                                       *
    * When cntType = 1, count the positive elements;                      *
    * When cntType = -1, count the negative elements;                    *
    * When cntType = 0, count the elements that are zeros.                *
    *****/
    int i, cnt = 0;
    for(i=numElements-1, i>=0, i--) {
        switch (cntType) {
            case '1' : cnt += Pos(A[i]); break;
            case '-1': cnt += Neg(A[i]); break;
            otherwise: cnt += Zero(A[i]);
        }
    }
    return cnt;
}

int Pos(int x) {
    if(x>0) return 1;
    else return 0;
}

int Neg(int x) {
    if (x<0) return 1;
    else return 0;
}

int Zero(int x) {
    if (x==0) return 1;
    else return 0;
}
```



DELIVERABLES

A written report is required for this project. The report must contain screen shots and explanations of simulation results. It doesn't have to be a full report. The entire program must be clearly commented and saved as a .s file, and also attached to the project report as an appendix.

This is an individual assignment. Your work must be submitted electronically to Canvas before the specified due date.

GRADING POLICY

Report, correctness, completeness, clarity of the program: 90%

Source code: 10%

Late submission will result in 0 point for the corresponding deliverables. Source code must be submitted before a grade for this project can be assigned.

DUE DATE

The project report is due by **11:59pm, September 30, 2019**