ECED3403 – Lab 1

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# Design

## Flow Chart

A diagram of a computer program

Description automatically generated

## Data Dictionary

Array = {Numeric}

Numeric = [“$” + [Unsigned | Signed] | “’” + Char + “’” | “#” = Hex]

Unsigned = [0 ... 65535]

Signed = [-32768 ... +0 ... +65535]

Char = [Alphanumeric | Escaped]

Hex = 1{0 ... 9 | A ... F | a ... f}4 \* Hex values range from #0 to #FFFF \*

Escaped = “\” + Alphanumeric

String = 1{Char}128

# Testing

### Adds integers in array

**Purpose:** Checks for successful addition of integers within the array.

**Configuration:** Fill an array of size 6 with a first word of 5, and integers of value 1.

**Expected Results:** The five integers of value 1 will be added together. The final computed sum, R3, should equal 5 after the program ends.

**Actual results:** The final computed sum in R3 equals 5 as expected.

A screen shot of a computer

Description automatically generated

### Add negative number

**Purpose:** Checks for the successful addition of integers where some are negative.

**Configuration:** Fill an array of size 6 with a first word of 5, and integers of varying values. These values will be 1, 2, -3, 4, and -5.

**Expected Results:** The final computed sum, R3, should equal -1 after the program ends.

**Actual results:** The counter register R1 equals -1 as expected.

A screen shot of a computer

Description automatically generated

### When counter reaches zero

**Purpose:** Checks for the counter reaching 0 when program ends.

**Configuration:** Fill an array of size 6 with a first word of 5, and integers of value 1.

**Expected Results:** The counter register, R1, should equal 0 after the program ends.

**Actual results:** The counter register R1 equals 0 as expected.

A screen shot of a computer

Description automatically generated

### Negative first word

**Purpose:** Checks for the counter reaching 0 when program ends.

**Configuration:** Fill an array of size 6 with a first word of -5, and integers of value 1.

**Expected Results:** The counter register, R1, should equal 0 after the program ends.

**Actual results:** The counter register R1 equals 0 as expected.

A screen shot of a computer

Description automatically generated

### Empty array

**Purpose:** Checks for what final register values are at the end of the program if the array is empty.

**Configuration:** The array has no starting word or integers.

**Expected Results:** The register values after the program ends should be:

* R0 array current memory value: 0044
* R1 count: FFFF
* R2 array current value: 0000
* R3 total sum: 0000

**Actual results:** The registers equal the expected values.

A screen shot of a computer

Description automatically generated

### Larger first word than array size

**Purpose:** Checks for how the program handles fewer array integers than expected.

**Configuration:** Fill an array of size 3 with a first word of 5, and integers of value 1.

**Expected Results:** The register values after the program ends should be:

* R0 array current memory value: 004C
* R1 count: 0000
* R2 array current value: Some memory value
* R3 total sum: Some value

**Actual results:** The registers equal the expected values.

A screen shot of a computer

Description automatically generated

### Smaller first word than array size

**Purpose:** Checks for how the program handles more array integers than expected.

**Configuration:** Fill an array of size 5 with a first word of 3, and integers of value 1.

**Expected Results:** The program will stop in the middle of the array instead of at the end. The register values after the program ends should be:

* R0 array current memory value: 0048
* R1 count: 0000
* R2 array current value: Some memory 0000
* R3 total sum: 0003

**Actual results:** The counter register R1 equals 0 as expected.

A screen shot of a computer

Description automatically generated