HW2 - MIPS assembly programming

> 📋 Content:
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> 🔗 Link source code:
>
> - Google Drive
> - GitHub

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Main idea

Problem 1: Compare two numbers

- Pseudo code

```
if (a > b) {
    print("a > b");
} else if (a < b) {
    print("a < b");
} else {
    print("a = b");
}
```

- Output screenshot

```
Input a: 4
Input b: 5
Result: a < b

-- program is finished running --

Input a: 5
Input b: 4
Result: a > b

-- program is finished running --

Input a: 4
Input b: 4
Result: a = b

-- program is finished running --
```

Problem 2: Check if a character is uppercase or lowercase

- Pseudo code

```
c = readChar("Input a character: ");
if (c >= 'A' && c <= 'Z') {
    print("Uppercase");
} else if (c >= 'a' && c <= 'z') {
    print("Lowercase");
} else {
    print("Invalid");
}
```

- Output screenshot

```
Input a character: A
Result: Uppercase

-- program is finished running --

Input a character: Z
Result: Uppercase

-- program is finished running --

Input a character: a
Result: Lowercase

-- program is finished running --

Input a character: z
Result: Lowercase

-- program is finished running --
```

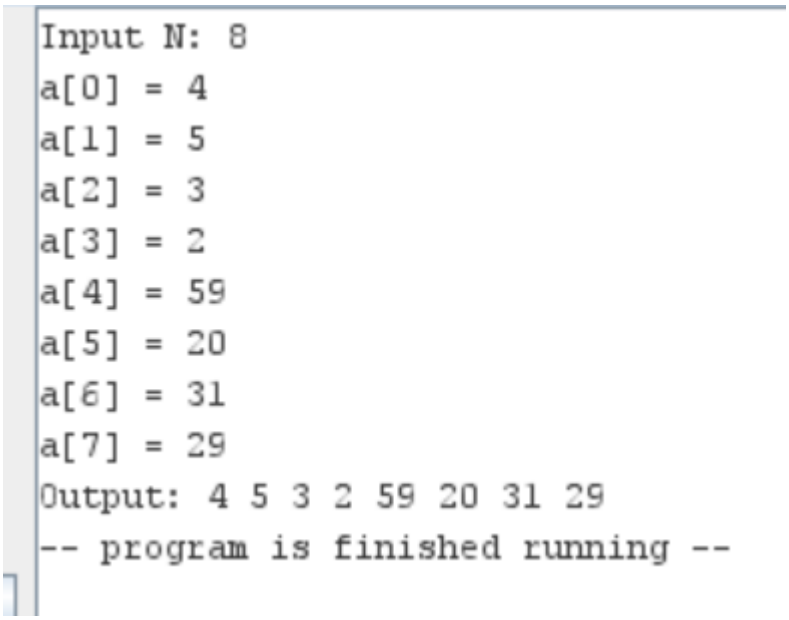
```
Input a character: 3
Result: Invalid (not a character)

-- program is finished running --

Input a character: H
Result: Uppercase

-- program is finished running --

Input a character: u
Result: Lowercase

-- program is finished running --
```

Problem 3: Input an integer array and print the array

- Pseudo code

```
n = readInt("Input n: ");
allocate a[n * 4];
int i = 0;
pointer p = a;
while (i < n) {
    *(p + i * 4) = readInt("Input a[" + i + "] = ");
    i++;
}
i = 0;
while (i < n) {
    print("a[" + i + "] = " + *(p + i * 4));
    i++;
}
```

- Output screenshot



Problem 4: Find the length of a string

- Pseudo code

```
s = readString("Input a string: ");
i = 0;
while (s[i] != '\0') {
    i++;
}
print("Length of the string: %d", i);
```

- Output screenshot

```
Input a string: Hello World!
Length of string:12

-- program is finished running --

Input a string: HTMT
Length of string:4

-- program is finished running --

Input a string: 22CLC06
Length of string:7

-- program is finished running --
```

Problem 5: Input an array of integers and find the sum of the array

- Pseudo code

```
n = readInt("Input n: ");
allocate a[n * 4];
int i = 0;
pointer p = a;
while (i < n) {
    *(p + i * 4) = readInt("Input a[" + i + "] = ");
    i++;
}
i = 0;
int sum = 0;
while (i < n) {
    sum += *(p + i * 4);
    i++;
}
print("Sum of the array: %d", sum);
```

- Output screenshot

```
Input N: 8
a[0] = 1
a[1] = 2
a[2] = 3
a[3] = 4
a[4] = 5
a[5] = 6
a[6] = 7
a[7] = 8
Sum of array: 36
-- program is finished running --
```