School of Computer Science – Architecture, Operating Systems and Networks

Lab Work Week 1

Architecture, Operating Systems and Networks TU259(Full Time) and TU262(Part Time)

# Instructions:

Please complete all tasks listed in this sheet. Parts 2/3/4 can be answered in this Word Document. Part 2 should use the PowerPoint slide file provided on Brightspace.

## **Part 1:** For the computer you are using, identify the following components and detail its specification:

* CPU: Intel(R) Core(TM) i7-7700HQ CPU @ 2.80GHz, 2808 Mhz, 4 Core(s), 8 Logical Processor(s)
* GPU: NVIDIA GeForce GTX 1060
* Ethernet: Realtek PCIe GBE Family Controller
* RAM: Micron and SK Hynix Total 16Gb
* Drive Type: SSD & HDD
* Drive Size: 118Gb & 1Tb
* Operating System: Microsoft Windows 10 Home

## **Part 2:** Create an example to demonstrate the Von Neumann Fetch/Decode/Execute cycle for the following high level program: X = 3

Y = 7

A = X + Y

Use the LibreOffice/PowerPoint file (Von\_Neumann\_Lab) on Brightspace to create the example.

* See Von\_Neumann\_Lab\_1\_PPT\_robert\_o\_sullivan.ppt

## **Part 3:** Explain the sequence when a user boots a PC. (Explain what happens and what hardware component is doing what?)

## Computer loads BIOS from RO

## BIOS triggers power-on self-test (POST)

## BIOS gets CPU to send signals over bus to check all components are functioning

## POST tests memory on display and video signals

## Cold boot causes memory controller to check all memory addresses with a quick read/write operation

## Computer then loads the operating system into RAM BIOS gives control to operating system

**Part 4:** Number Conversions

Read the examples and complete the number conversion problems provided in the additional numbering system document in our lab section on Brightspace.

**See excel sheet attached**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | DEC | BIN | DEC | BIN | DEC | BIN |
| Convert from decimal to binary | 232.0 | 0 | 419.0 | 0 | 512.0 | 0 |
|  | 116.0 | 0 | 209.5 | 1 | 256.0 | 0 |
|  | 58.0 | 0 | 104.8 | 1 | 128.0 | 0 |
|  | 29.0 | 0 | 52.4 | 1 | 64.0 | 0 |
|  | 14.5 | 1 | 26.2 | 1 | 32.0 | 0 |
|  | 7.3 | 1 | 13.1 | 1 | 16.0 | 0 |
|  | 3.6 | 1 | 6.5 | 1 | 8.0 | 0 |
|  | 1.8 | 1 | 3.3 | 1 | 4.0 | 0 |
|  | 0.9 | 1 | 1.6 | 1 | 2.0 | 0 |
|  |  | **000011111** |  | **011111111** |  | **000000000** |
|  |  |  |  |  |  |  |
| convert decimal to Octal | DEC | OCT | DEC | OCT | DEC | OCT |
|  | 34 | 4.3 | 254 | 31.75 | 319 | 39.88 |
|  | 30 | 30 | 75 | 75.00 | 88 | 88.00 |
|  |  | **43** | 0 | 0.00 | 0 | 0.00 |
|  |  |  |  | 376 |  | 477 |
|  |  |  |  |  |  |  |
| convert decimal to hexadecimal | DEC | HEX | DEC | HEX | DEC | HEX |
| 231 | 231 | 14.4375 | 452 | 28.25 | 634 | 39.625 |
| 452 | 4 | 4 | 25 | 25 | 63 | 63 |
| 634 |  | **E4** |  | **EEC** |  | **99FFF** |
|  |  |  |  |  |  |  |
| convert hexadecimal to binary | HEX | BIN | HEX | BIN |  |  |
|  | 88A | **000010000001010** | DEF | **000011010000111000001111** | | |

# Upload:

Upload all of your labwork to Brightspace to the upload link for Lab 1.

Double check your upload to ensure you have included all the required components.

If you are not sure on how to upload please watch this video:

https://youtu.be/FtoY0IrtpWA

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