Computer Components

- Processor
- Motherboard
- GPU
- RAM
- Hard drive
- Power supply
- Heat sink (if not included)
- DVD/CD drive

Optional

- Extra cooling
- Network card
- Sound card

Machine Instructions

- Instructions that processor executes
- Micro operations

Characteristics

Machine instructions are executed by the processor. The collection of instructions is referred to as the collection set.

Elements

- Opcode
- Specifies the operation to be performed, specified by a binary code.
- Operand
- Result operand reference
- Next instruction reference

Instruction Representation

16 bit instruction, 4 bits = opcode, next 12 (6, 6) used for 2 operands.

Assembly language looks as such: `ADD.B D2, D3`
An assembler takes this assembly language code and transforms it into machine code that can be executed on the processor.

Assembly language is hardware dependent. A different assembly language for each processor.

Instructions in assembly can make reference to specific registers in the processor.

Definition: > A symbolic representation of the machine language of a specific processor, > augmented by additional type of statements

Compiler translates high-level language into machine code. Executable code is generated by the assembler, that the processor can execute.

Linker

A utility program that combines one of more files containing object code from separately compiled program modules into a single file.

Assembly Language Elements

Label - Mnemonic -

Dr Dianabasi Nkantah email: ab0480@coventry.ac.uk tel: 02477658361

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Generations of computers

- 1st: Vaccum tube
- 2nd: Transistors
- 3rd: Integrated circuit

1st Generation

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2nd Generation

Introduction of transistors into the building of processors. Not until lste 1950s that fully transitorized computers were commercially available.

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Single, self contained transistor. Also on tehh circuit board are resistors and capacitors.

Interrupts

Interrupts are a mechanism by which a normal sequence of events can be prevented. There are multiple types of interrupts, that are caused by different situations. - Program Interrupts - This could caused by an overflow error, or a division by zero - Timer - Generated by internal processor timer - Used in a pre-emptive multi-tasking - I/O - From an I/O controller - Hardware failure - I.e a memory parity error

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Main memory - RAM (volatile memory) Secondary storage - (HD) Instructions and data all stored in memory

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ALU and control resides in between main memory and the I/O devices. Good diagram on the slideshow on moodle.

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Gates are made up of transistors. Combination of gates can be used to solve mathematical operations.

Computer Architecture and Networks

Exercise 2a: Number Systems

1) *Convert the following binary numbers to decimal:*

a. 1101 = 13

b. 01101001 = 105

c. 1101001110.101 = 846.625

2) *Convert the following decimal numbers to binary:*

a. 67 = 01000011

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3) *Convert the following decimal numbers to 8-bit binary values:*

a. 48 = 00110000

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c. 165 = 10100101

4) *Convert the following hexadecimal numbers to binary:*

a. 63F = 0110 0011 1111

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c. F00D = 1111 0000 0000 1101

5) *Convert the following binary numbers to hexadecimal:*

a. 1001 0011 = 93

b. 1010 0010 1110 0101 = A2E5

c. 1100 1001 1101 1000 01 = C9D81

6) *Convert the following hexadecimal numbers to decimal:*

a. A7E = 1010 0111 1110 = 2686

b. 95BF = 1001 0101 1011 1111 = 38335
c. 50B = 0101 0000 1011 = 1291

7) *Convert the following decimal numbers to hexadecimal:*

a. 46 = 0010 1110 = 2E

b. 139 = 1000 1011 = 8B

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8) *Convert the following octal numbers to binary:*

a. 627 = 110 010 111

b. 4550 = 100 101 101 000

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9) *Convert the following binary numbers to octal:*

a. 101 011 001 = 531

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a. 8 = 1000

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14) *Perform the following arithmetic operations:*

a. 1101(bs2) + 1011(bs2) = 11000

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11111101 01111000 ——— 101110101

Report on three peripherals

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Oculus Rift

Introduction

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RAM

RAM can be divided into two technologies, DRAM and SRAM. DRAM is Dynamic Ram. This type of RAM is made with cells that store data as charges on capacitors. The presence or absence of a charge is interpreted as binary. It requires periodic charge refreshing to maintain the correct data. The term dynamic is applied due to the charge tending to leak away, even with constant power being supplied.

SRAM is Static RAM. They use the same logic components as a processor. Binary values are stored using the traditional flip-flop logic gate configurations, it holds its data as long as power is supplied. It is a more expensive type of RAM, and is faster.

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Function Units from Logic Gates

Decoders

Manager call 7 assistants. 2 options:
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