Subject 01: Introduction to computers

PLAN 2016

Exercises

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# 1.1 – Theoretical questions

1.1.1. What technological advance does mark the beginning of the computer's third generation?

A) The electronic switch

B) The microprocessor

C) The transistor

D) The integrated circuits

E) None of the previous answers

ANSWER: D) The integrated circuits

1.1.2. Where do programs are stored in a computer based on Von Neumann's architecture?

A) In massive storage devices (Hard drive, DVDs, CDs, etcetera)

B) Input/Output devices

C) Inside the processor

D) In the ALU

E) None of the previous answers

ANSWER: E) None of the previous answers

# 1.2 – Basic data representation systems

1.2.1. What is the decimal value of the string 010000010011,0101BCD

ANSWER:

010000010011,0101BCD = 413,510

1.2.2. Write the number 503,610 on its corresponding BCD representation.

ANSWER:

503,610= 010100000011,0110BCD

1.2.3. Write the binary value 101,12 in hexadecimal

ANSWER:

101,12 = 5,816

1.2.4. Convert the following binary string 11,012 into octal form.

ANSWER:

11,012= 3,28

1.2.5. Convert the following octal number 7118 into hex format.

ANSWER:

7118= 1C916

1.2.6. Convert the following octal number 101,18 into hex format.

ANSWER:

101,18 = 41,216

1.2.7. Convert the following hexadecimal number 54F7,1116 into octal format.

ANSWER:

54F7,1116= 52367,0428

1.2.8. What is the decimal value of the string 110011101,12 ?

ANSWER:

110011101,12= 413,510

1.2.9. Convert the following decimal number 635,410 into octal format.

ANSWER:

635,410 = 1173´38 Aprox.

1.2.10. What is the decimal value of the string 19D,816?

ANSWER:

19D,816= 413,510

1.2.11. Convert the following decimal number 635,410 into binary format.

ANSWER:

635,410 = 1001111011,01102

Period= 0110

1.2.12. Convert the following decimal number 2165310 into octal format.

ANSWER:

2165310= 522258

1.2.13. Convert the following decimal number 90060910 into hex format.

ANSWER:

90060910= DBE0116

1.2.14. What is the octal format of the string 00111000BCD?

ANSWER:

First step: You MUST obtain the decimal value (There is no other way!):

Be careful each digit is a binary digit (You cannot expand it)

00111000BCD= 468

These steps are similar when it is necessary to obtain the hex format of a string in bcd format.

The difference is in the third step.

# 1.3 – Characteristic computer parameters

1.3.1. The processor MIPS R2000 can address up to 4 GB (Giga Bytes) of main memory. If the word-length of this processor is of 32 bits, how many 32-bits words can address the MIPS R2000?

ANSWER:

1073741824 words

1.3.2. Let's suppose a processor that is capable of executing every cycle an instruction of 32 bits stored in memory. Bearing in mind that the cycle-time is of 2 ns. What is the required bandwidth between the processor and the memory?

ANSWER:

1,6\*1010 bits/s