

Taller de Lectocomprensión y Traducción en Inglés

PRACTICA PARA EL EXAMEN FINAL LIBRE - A

ERROR CORRECTION

A semiconductor memory system is subject to errors. These can be categorized as hard failures and soft errors. A hard failure is a permanent physical defect so that memory cell or cells affected cannot reliably store data, but become stuck at 0 or 1 or switch erratically between 0 and 1. Hard errors can be caused by harsh environmental abuse, manufacturing defects, and wear. A soft error is a random, non-destructive event that alters the contents of one or more memory cells, without damaging the memory. Soft errors can be caused by power supply problems or alpha particles. These particles result from radioactive decay and are distressingly common because radioactive nuclei are found in small quantities in nearly all materials. Both hard and soft errors are clearly undesirable, and most modern main memory systems include logic for both detecting and correcting errors. When data are to be read into memory, a calculation, depicted as a function f is performed on the data to produce a code. Both the code and the data are stored. When a previously stored word is read out, the code is used to detect and possibly correct errors. A new set of K code bits is generated from the M data bits and compared with the fetched code bits. The comparison yields one of three results:

- No errors are detected. The fetched data bits are sent out.
- An error is detected, and it is possible to correct it. The data bits plus error-correction bits are fed into a corrector, which produces a corrected set of M bits to be sent out.
- An error is detected, but it is not possible to correct it. This condition is reported.

Glosario: <i>hard failure:</i> error permanente <i>soft error:</i> error transitorio

1. Transcriba a qué refieren las siguientes palabras subrayadas en el texto.

- a. **these** _____
- b. **that** _____
- c. **these particles** _____
- d. **it** _____
- e. **which** _____

2. Lea el texto con atención y responda las siguientes preguntas en español.

- a. ¿Cuál es la diferencia entre un error permanente y uno transitorio?

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b. Explique cómo se detectan los errores en la memoria principal.

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c. ¿Qué sucede una vez que se detectan los errores?

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3. Traduzca los siguientes grupos nominales:

- a. a semiconductor memory system _____
- b. radioactive nuclei _____
- c. logic for both detecting and
correcting errors _____
- d. a previously stored word _____
- e. a new set of K code bits _____

4. Traduzca el siguiente texto.

Error Correction (Continued)

Codes that operate in this fashion are referred to as *error-correcting codes*. A code is characterized by the number of bit errors in a word that it can correct and detect. The simplest of the error-correcting codes is the *Hamming code* devised by Richard Hamming at Bell Laboratories. With three intersecting circles, there are seven compartments. We assign the 4 data bits to the inner compartments. The remaining compartments are filled with what are called *parity bits*. Each parity bit is chosen so that the total number of 1s in its circle is even. Thus, since circle A includes three data 1s, the parity bit in that circle is 1. Now, if an error changes one of the data bits, it is easily found. By checking the parity bits, discrepancies are found in circle A and circle C but not in circle B. Only one of the seven compartments is in A and C but not B. The error can therefore be corrected by changing that bit. To clarify the concepts involved, we will develop a code that can detect and correct single-bit errors in 8-bit words.