Is Software Malfunction an Oxymoron?

Jesse Hughes

July 25, 2007

Outline

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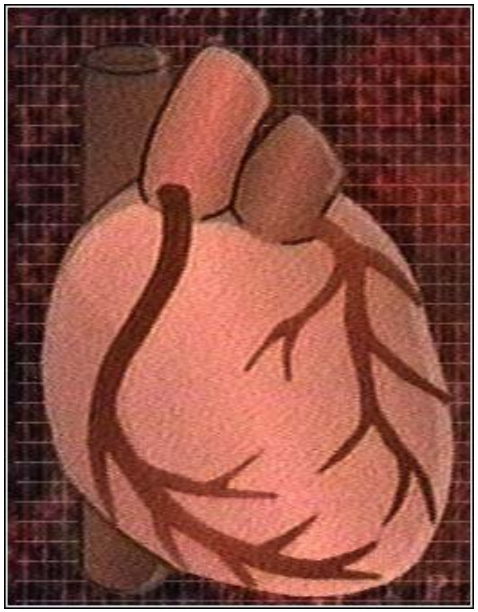

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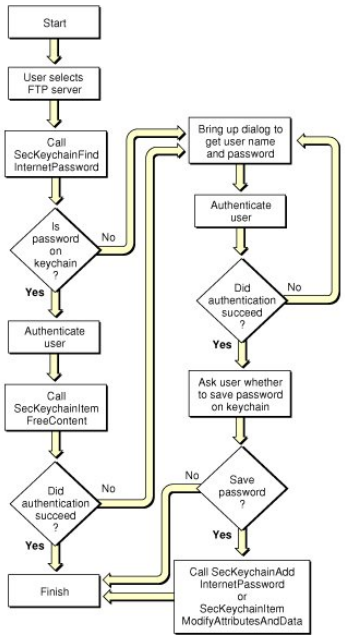

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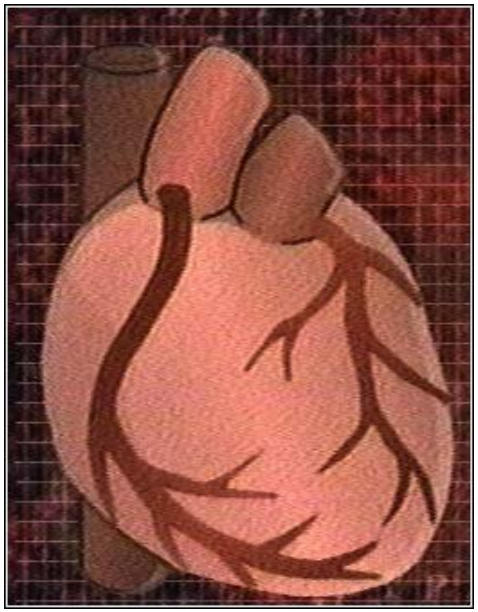

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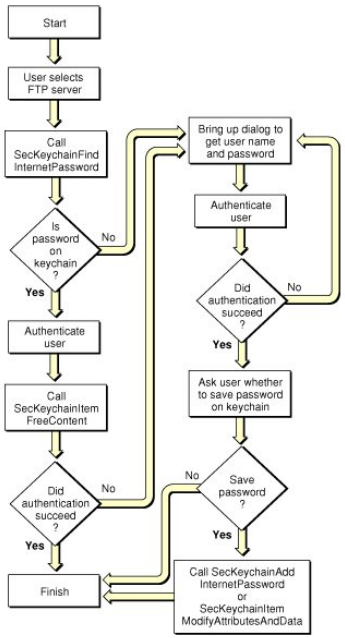

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In sum: Function-bearers are capable of malfunction.

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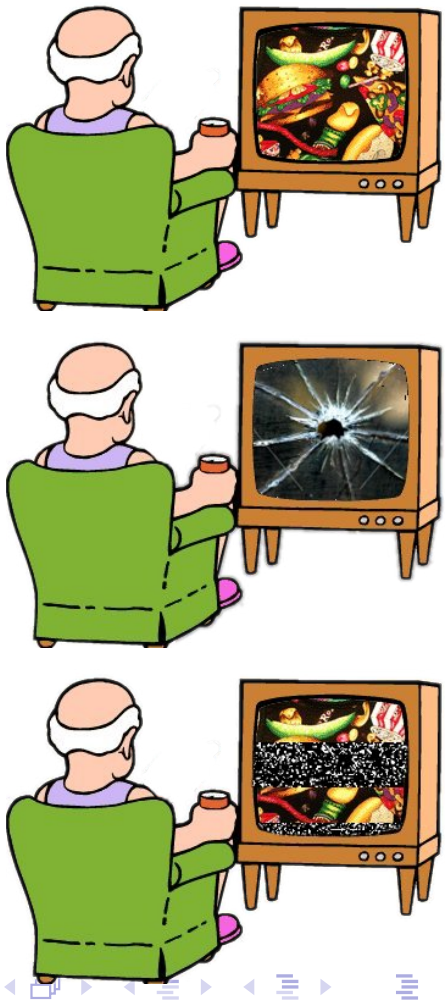
But what about a TV with poor reception?



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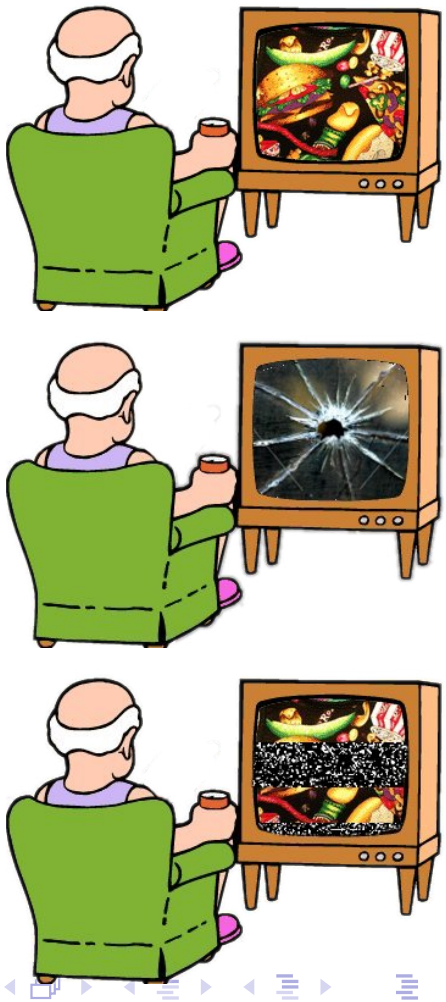
Token dysfunction (weak)

A token *dysfunctions* if it cannot perform its function *reliably* or *effectively*.



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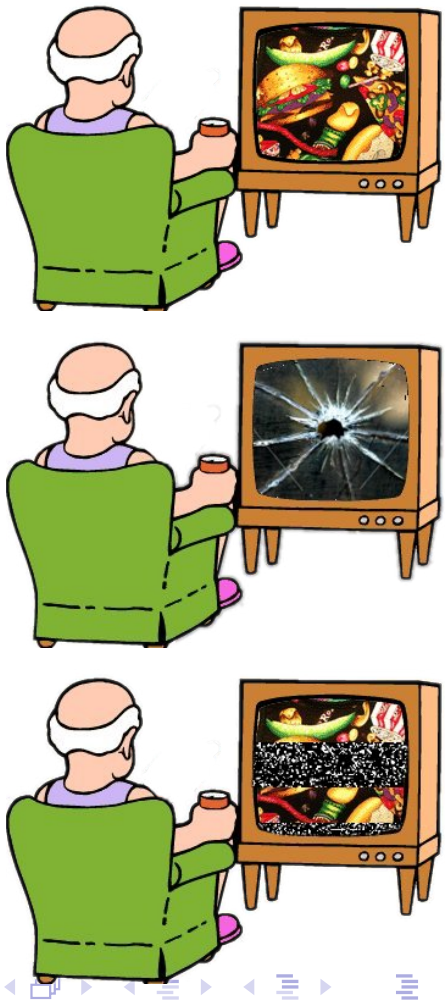

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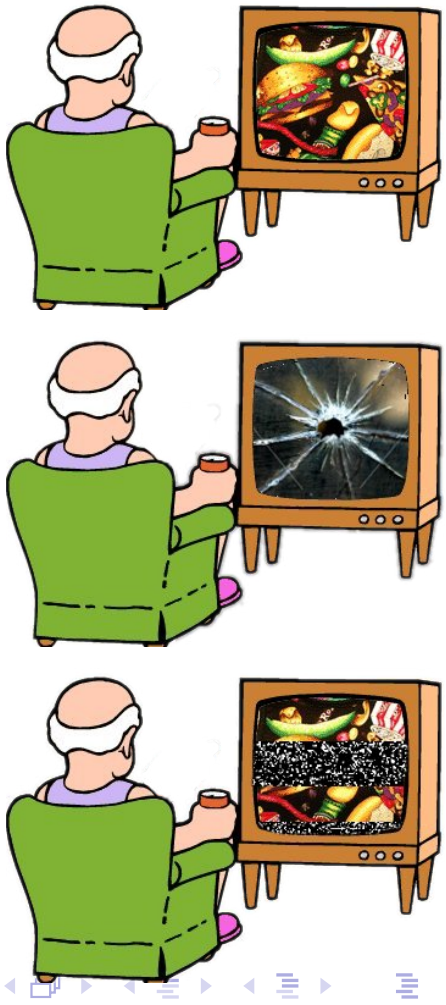

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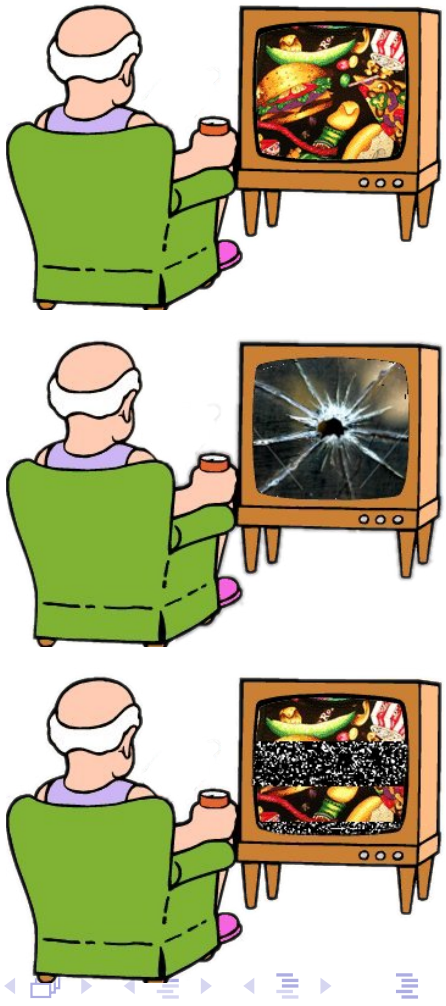

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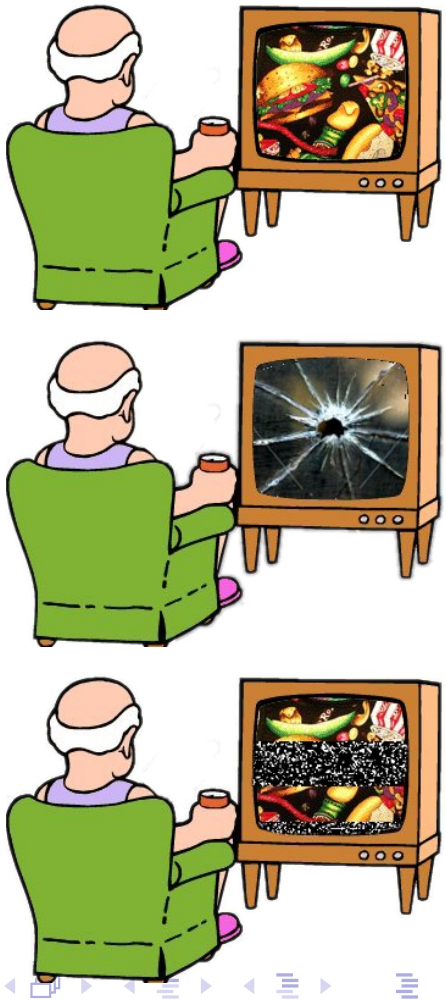

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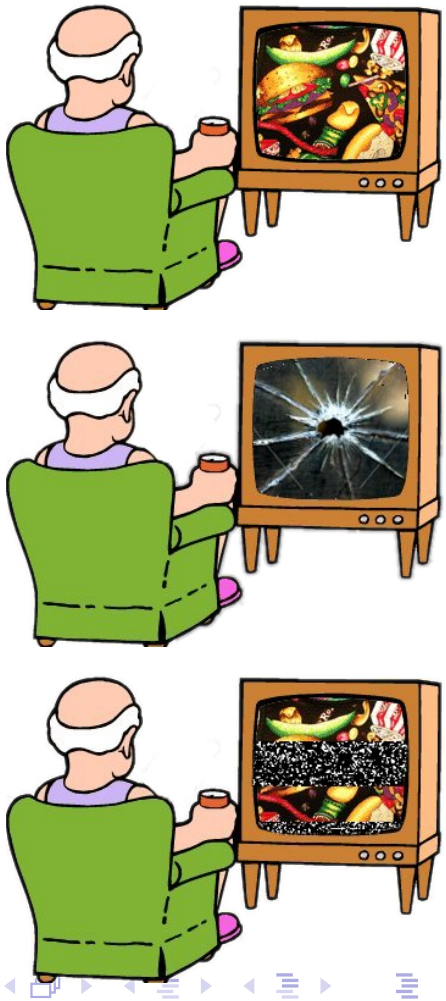

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Type: Defined by code.

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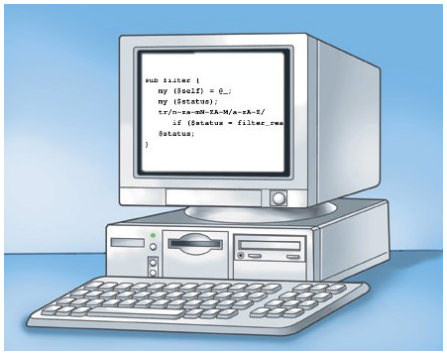

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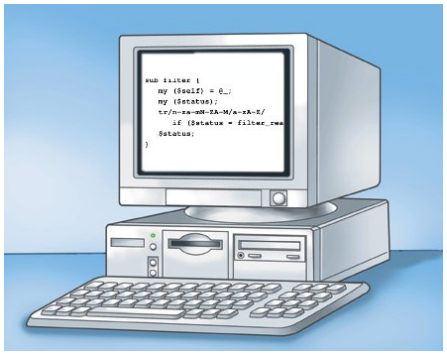

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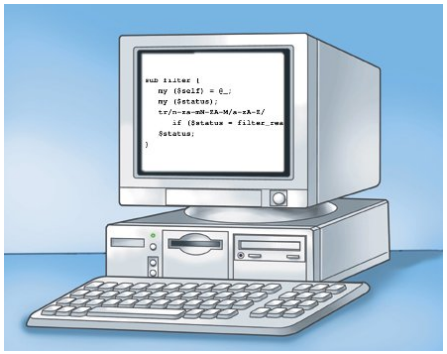

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Note: A bit vague when mediocrity becomes dysfunction!

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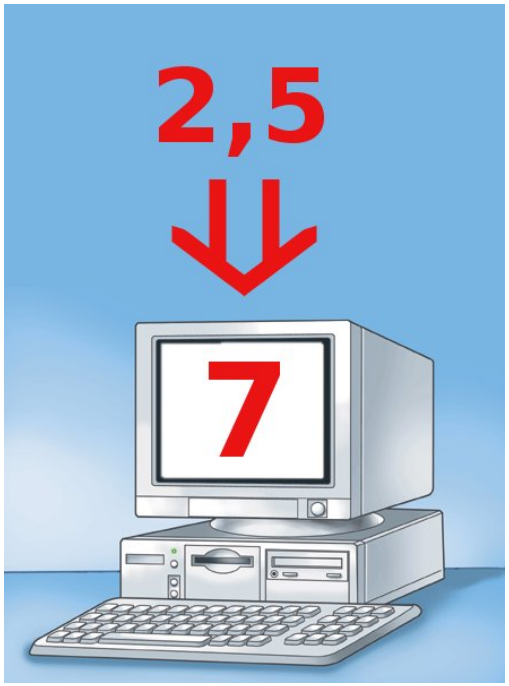
Example: A program is an adder if:

Given appropriate input x, y

Output $x + y$.



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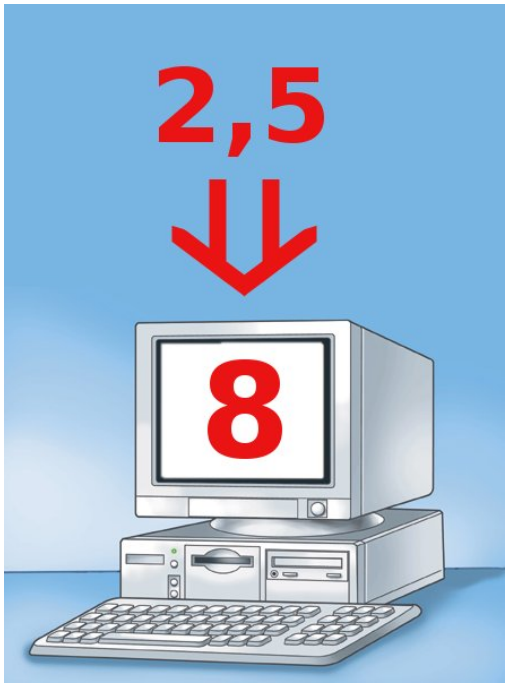

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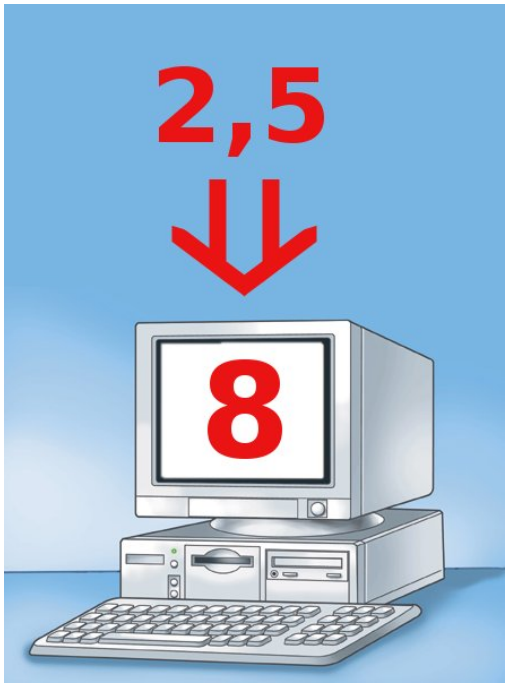

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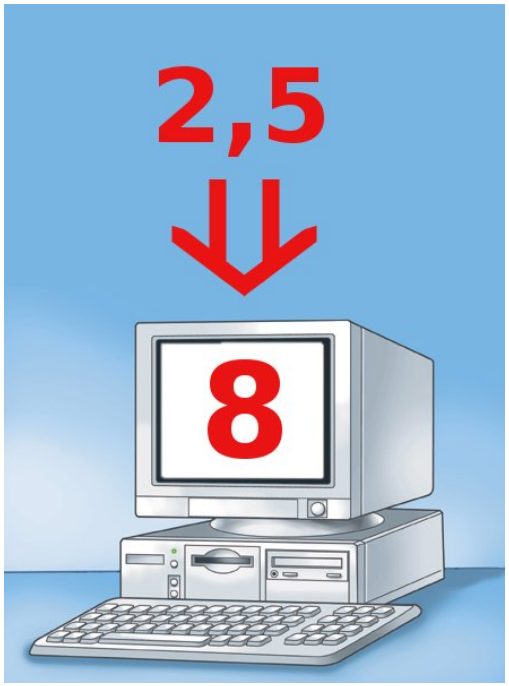

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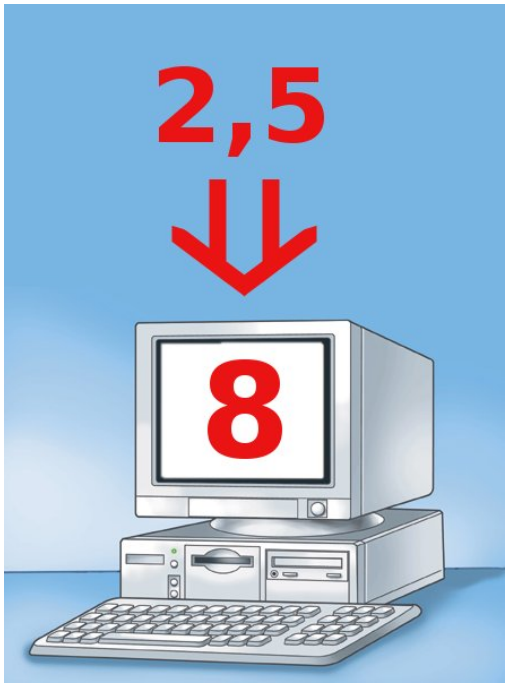

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- Axioms for mathematical models

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Consider a chess program that

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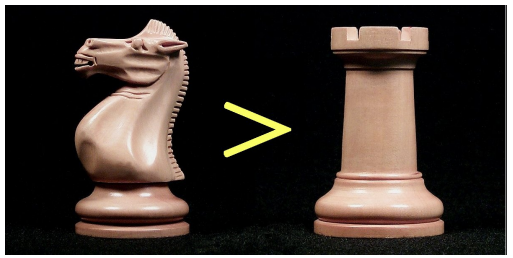

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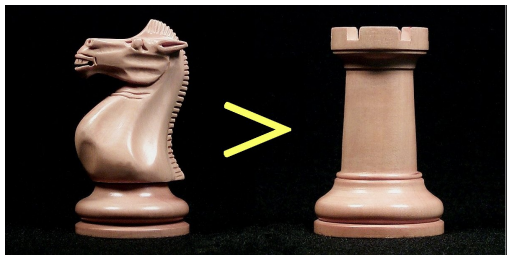

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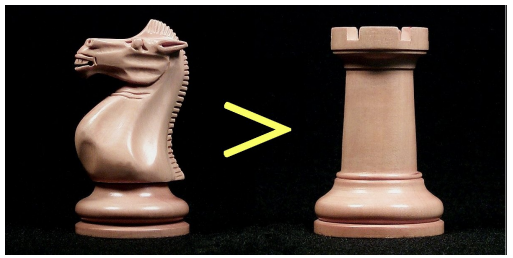

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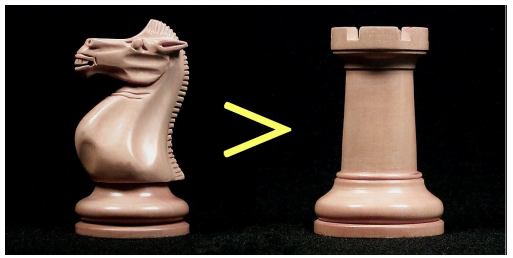

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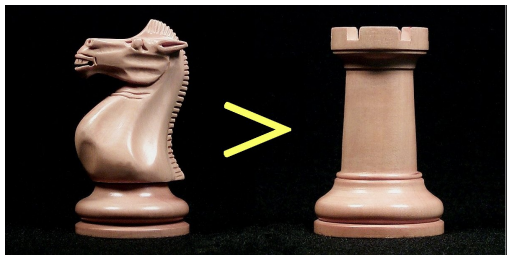

Software is capable of *type dysfunction*.

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Example: Floor-scorching stove

A certain gas stove was constructed without a heat shield.

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- But malfunctioning nonetheless!

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Dysfunction: Not doing what it should.
Misfunction: Doing what it shouldn't.

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Misfunctioning software

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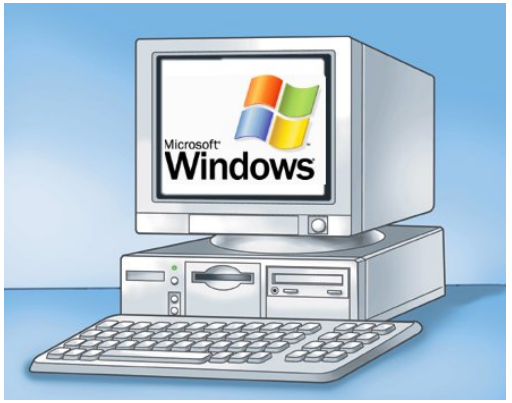

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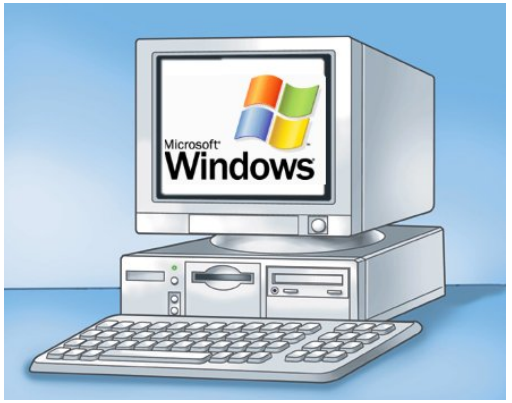

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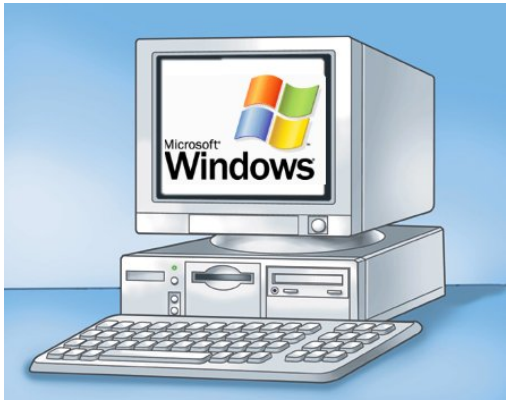

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  The ping of death. . . now dysfunction!

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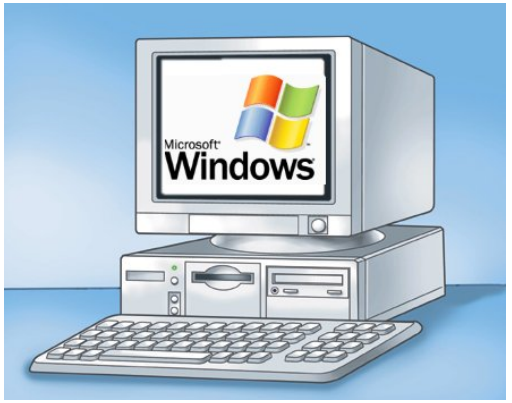
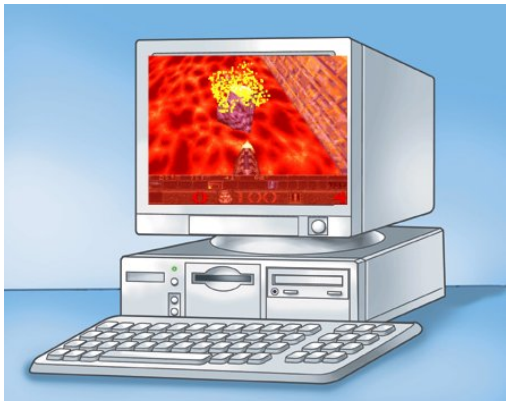


Examples:

- Misleading interfaces
  `Anna.Kournikova.jpg.vbs` appears as `Anna.Kournikova.jpg`
- Security flaws
  The ping of death. . . now dysfunction!
- Unrealistic game physics
  Strafe jumping



Misfunctioning software

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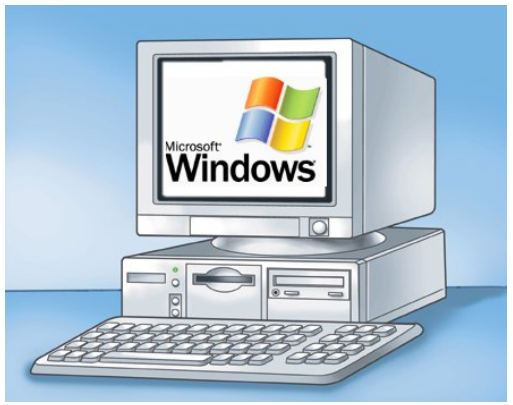

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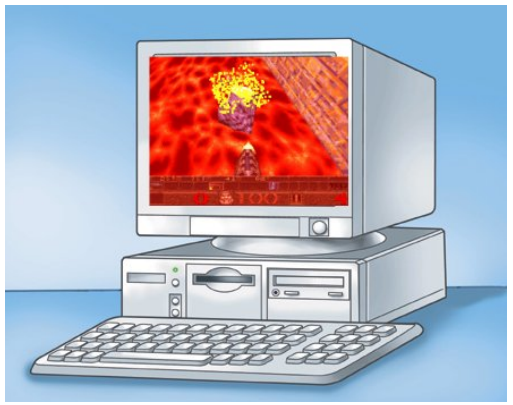
- Security flaws
  The ping of death. . . now dysfunction!
- Unrealistic game physics
  Strafe jumping. . . now de rigueur!



Malfunction: the old picture

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      if ($status = filter_read()) > 0;
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  . . . missing most software bugs.

Malfunction: the new picture

	Dysfunction		Misfunction	
	token	**type**	**token**	**type**
Artifact				
Biological				
Software				

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Software				

Note: Outstanding issues with biological type malfunction!

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Thank you!