(**Conocimiento** expresado en un)

Modelo Computable

de un ***Dominio de Problema***

de la Realidad

¿Dónde está expresado el modelo?

Glenn Vandenburg: Real software engineering

https://youtu.be/RhdlBHHimeM

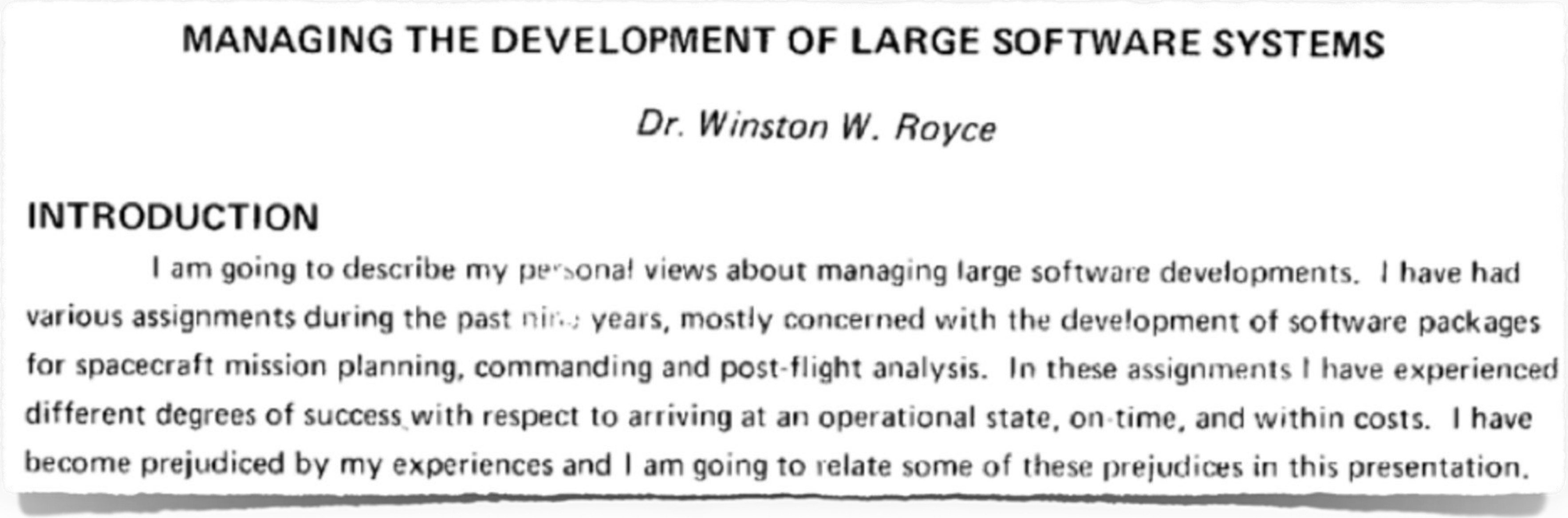
Interludio

LONE STAR
RUBY CONFERENCE

Yet if these phenomena fail to satisfy the various external constraints, then invariably a major redesign is required. In effect the development process has returned to the origin and one can expect up to a 100-percent overrun in schedule and/or costs.

—*Winston Royce*

2010
*** rough cut ***



MANAGING THE DEVELOPMENT OF LARGE SOFTWARE SYSTEMS

Dr. Winston W. Royce

INTRODUCTION

I am going to describe my personal views about managing large software developments. I have had various assignments during the past nine years, mostly concerned with the development of software packages for spacecraft mission planning, commanding and post-flight analysis. In these assignments I have experienced different degrees of success with respect to arriving at an operational state, on-time, and within costs. I have become prejudiced by my experiences and I am going to relate some of these prejudices in this presentation.

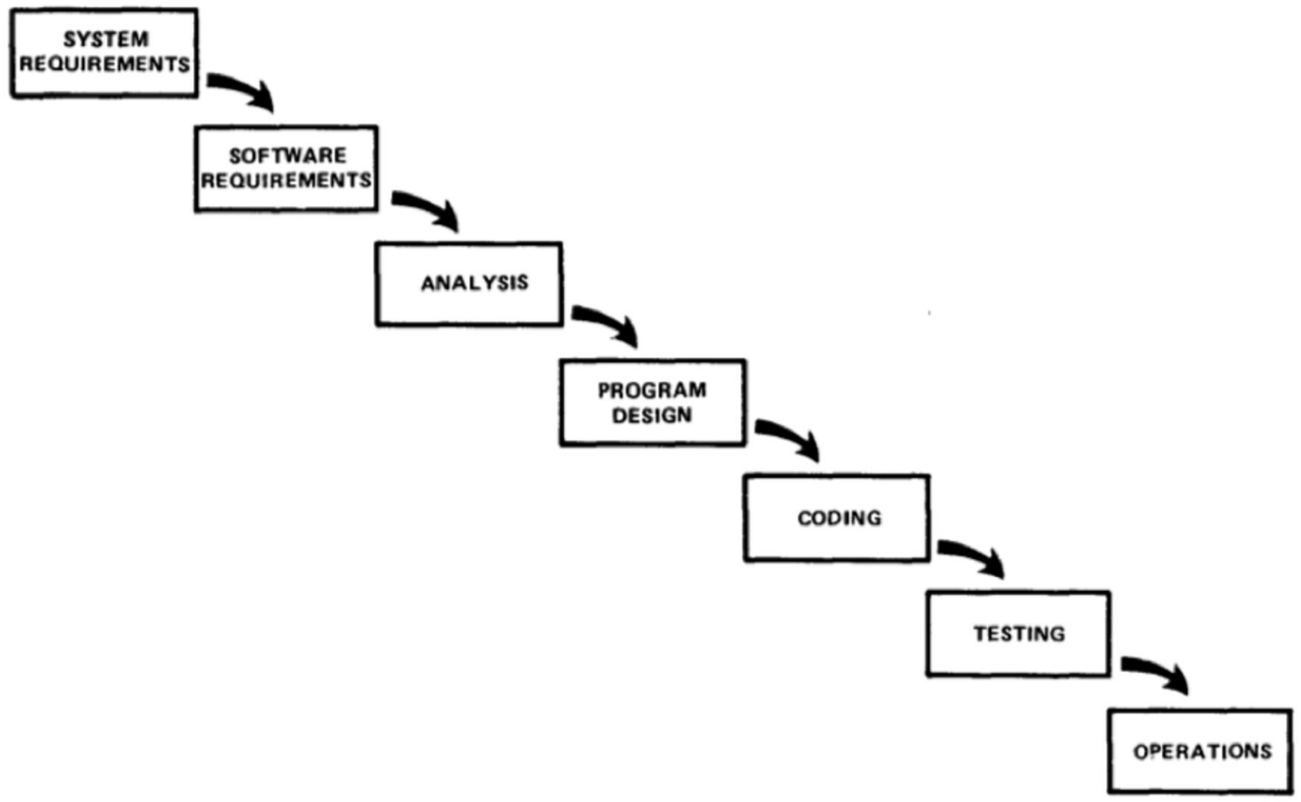
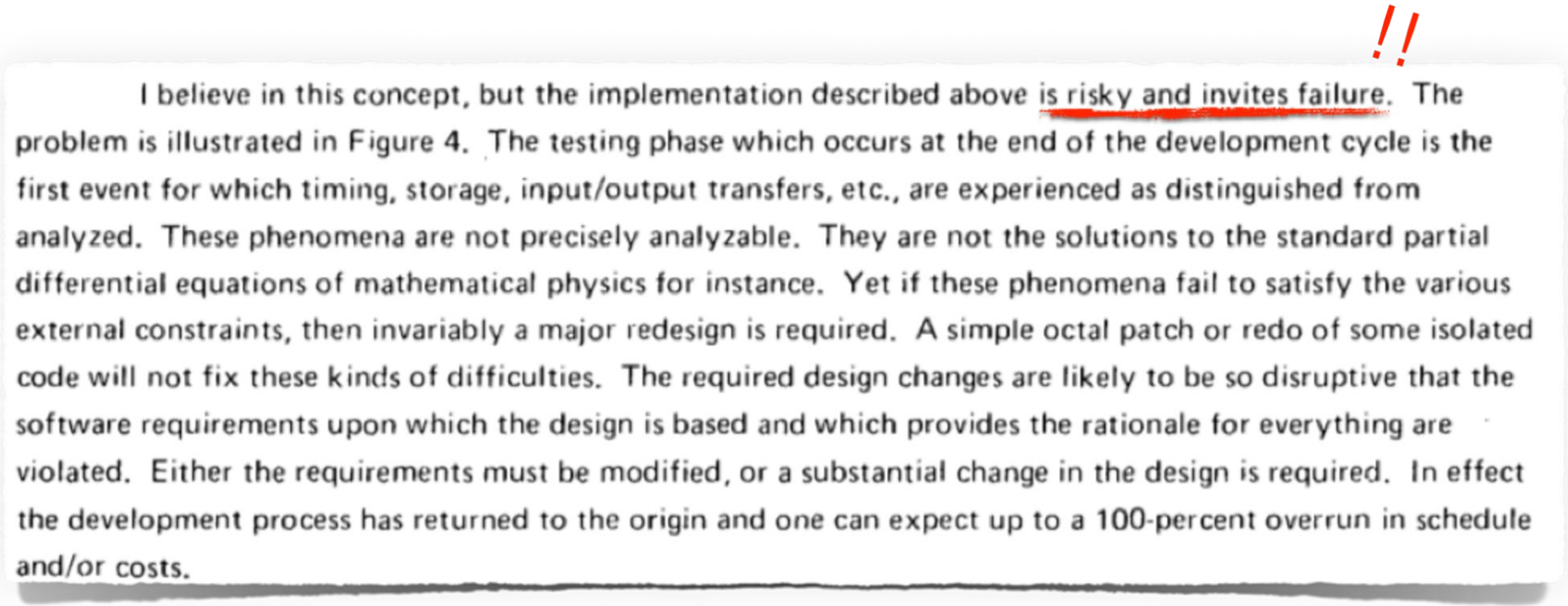


Figure 2. Implementation steps to develop a large computer program for delivery to a customer.



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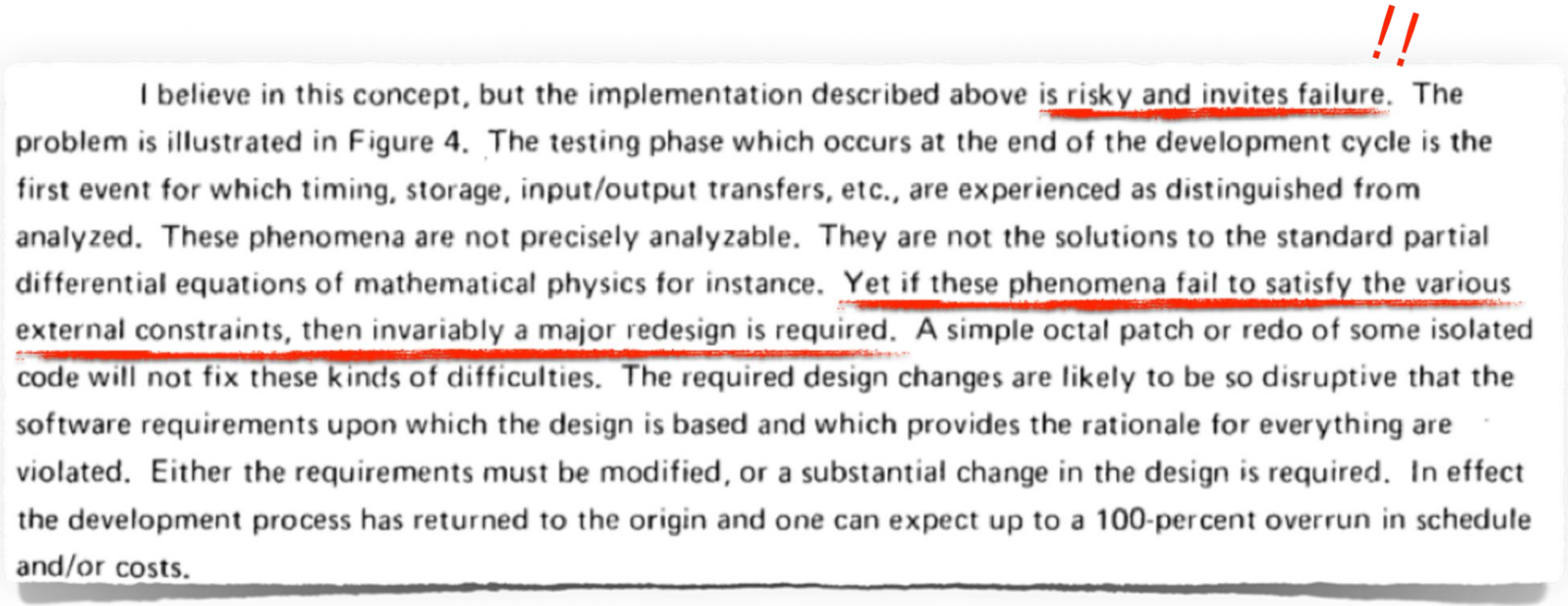
I believe in this concept, but the implementation described above is risky and invites failure. The problem is illustrated in Figure 4. The testing phase which occurs at the end of the development cycle is the first event for which timing, storage, input/output transfers, etc., are experienced as distinguished from analyzed. These phenomena are not precisely analyzable. They are not the solutions to the standard partial differential equations of mathematical physics for instance. Yet if these phenomena fail to satisfy the various external constraints, then invariably a major redesign is required. A simple octal patch or redo of some isolated code will not fix these kinds of difficulties. The required design changes are likely to be so disruptive that the software requirements upon which the design is based and which provides the rationale for everything are violated. Either the requirements must be modified, or a substantial change in the design is required. In effect the development process has returned to the origin and one can expect up to a 100-percent overrun in schedule and/or costs.



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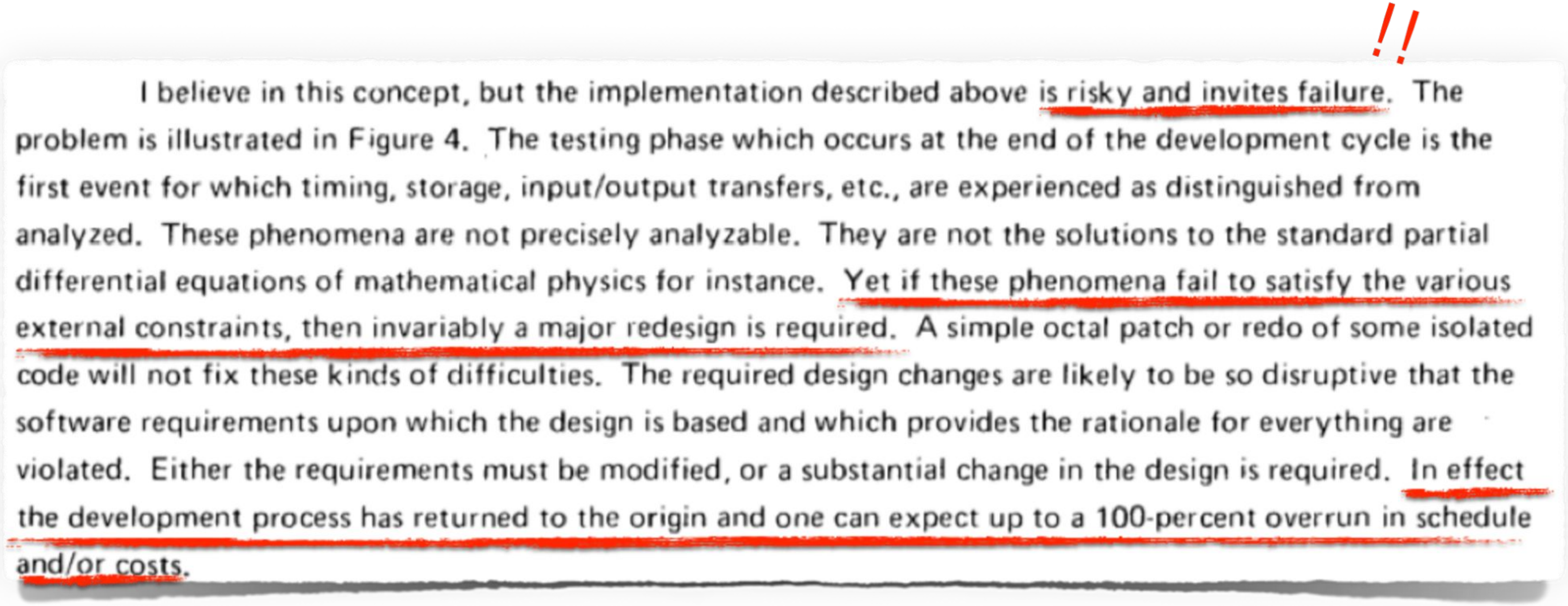

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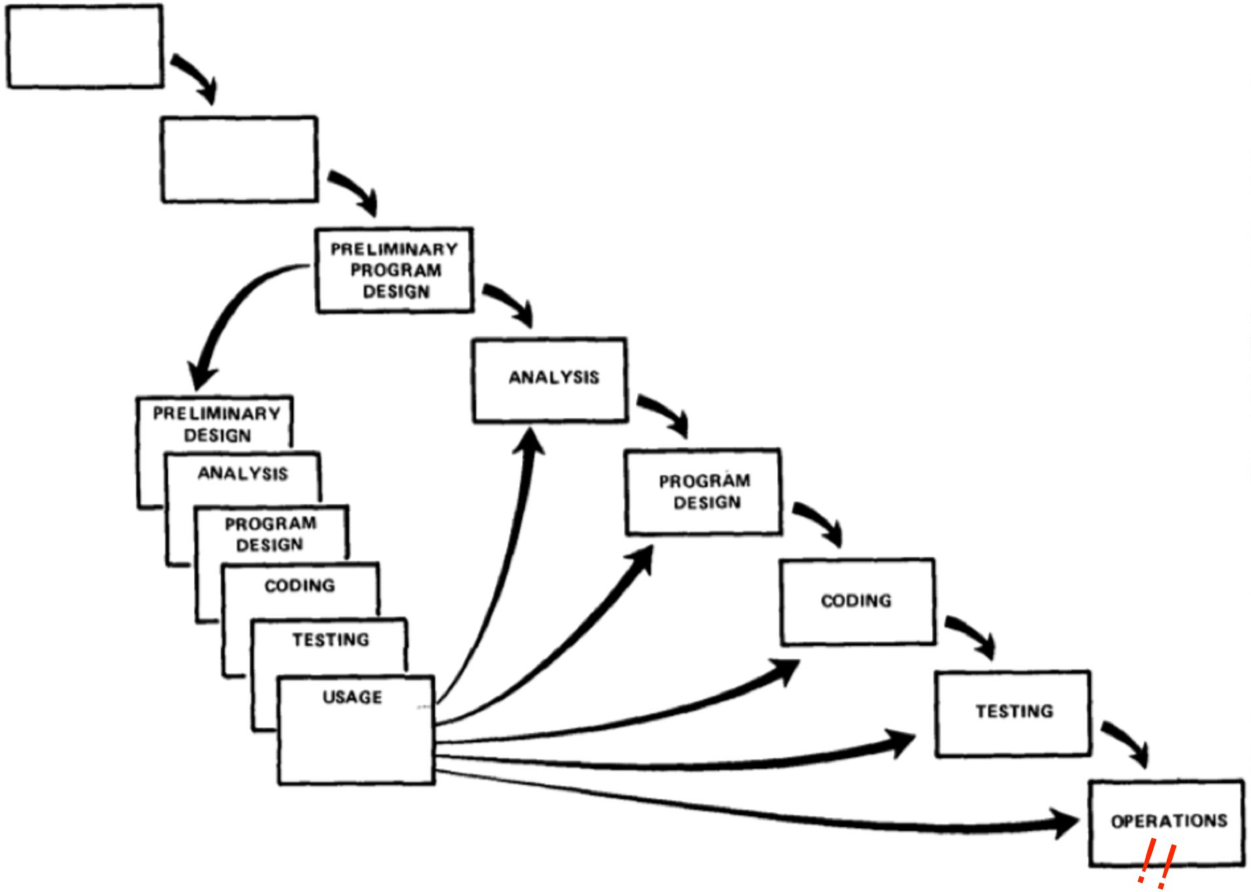
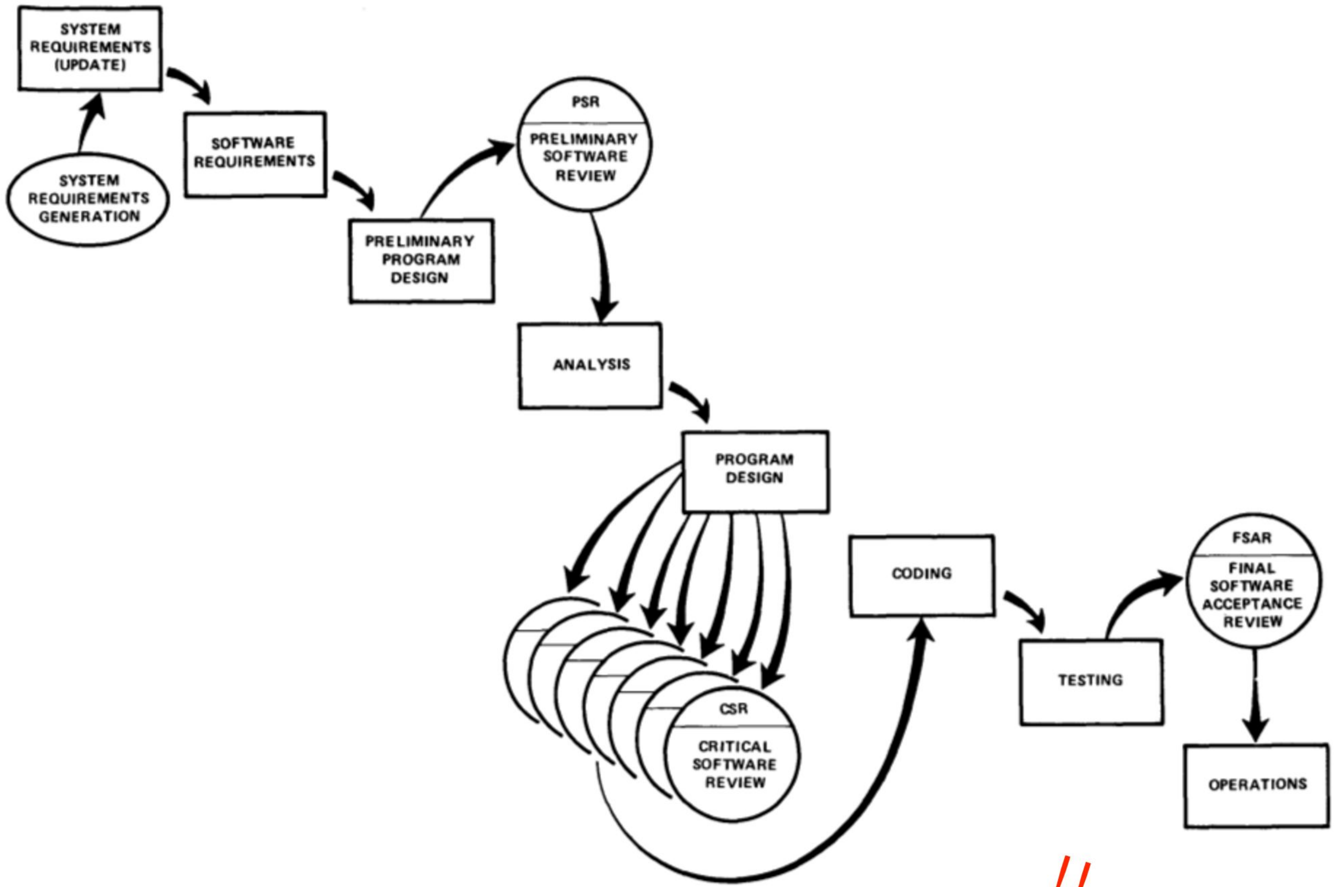


Figure 7. Step 3: Attempt to do the job twice – the first result provides an early simulation of the final product.

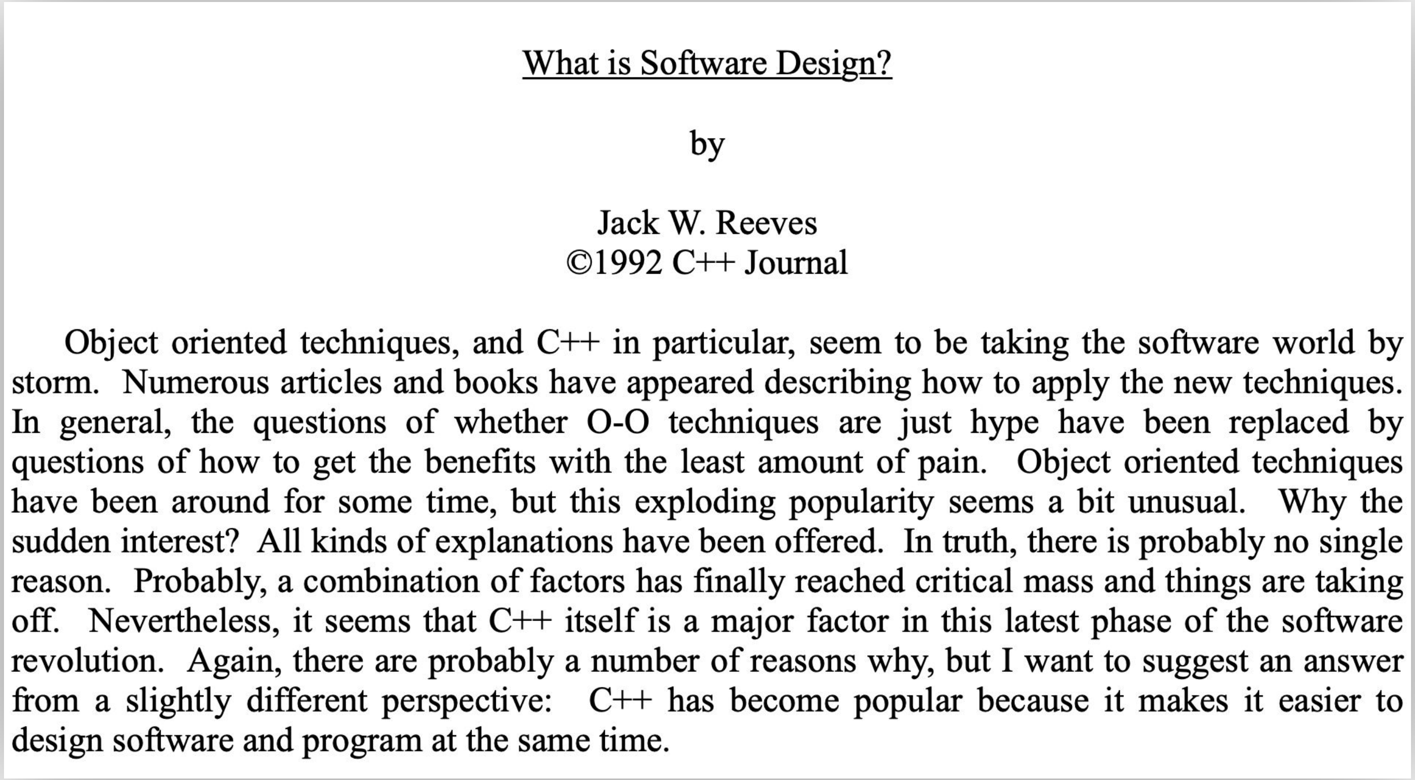

SYSTEM REQUIREMENTS (UPDATE)
SYSTEM REQUIREMENTS GENERATION
SOFTWARE REQUIREMENTS
PRELIMINARY PROGRAM DESIGN
PSR
PRELIMINARY SOFTWARE REVIEW
ANALYSIS
PROGRAM DESIGN
CSR
CRITICAL SOFTWARE REVIEW
CODING
TESTING
FSAR
FINAL SOFTWARE ACCEPTANCE REVIEW
OPERATIONS

!!

Figure 9. Step 5: Involve tne customer – the involvement should be formal, in-depth, and continuing.

Fin del Interludio

Ahora sí escuchemos a Glenn Vanderburg



What is Software Design?

by

Jack W. Reeves
©1992 C++ Journal

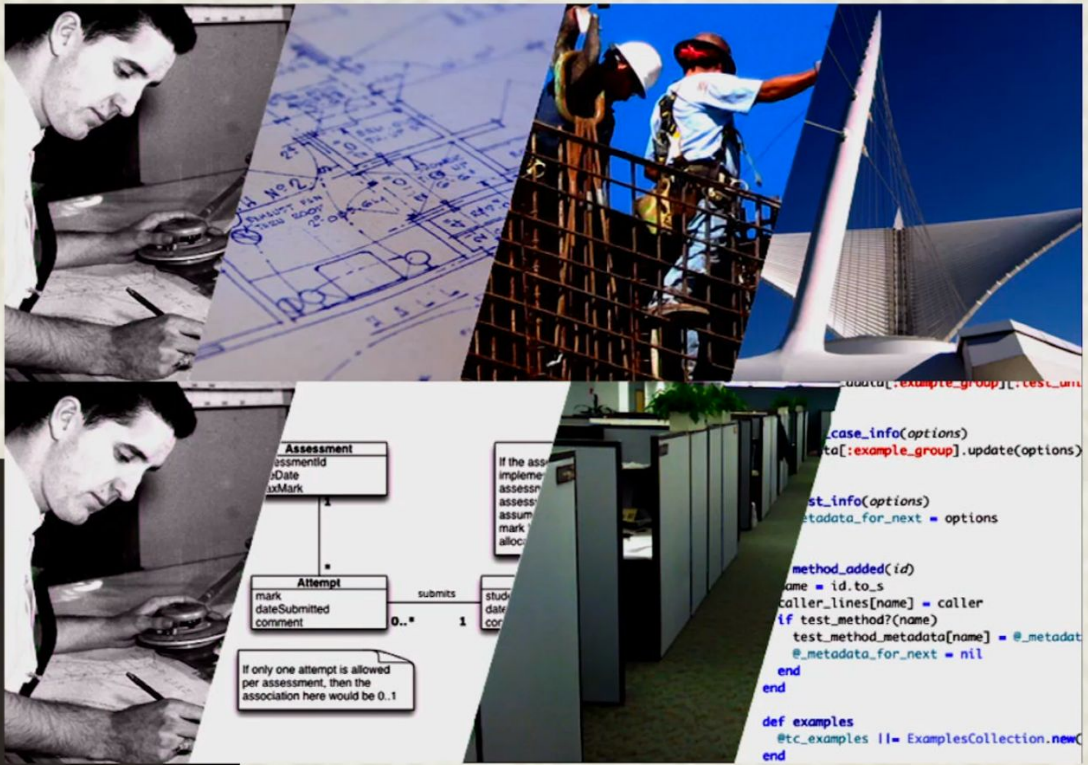
Object oriented techniques, and C++ in particular, seem to be taking the software world by storm. Numerous articles and books have appeared describing how to apply the new techniques. In general, the questions of whether O-O techniques are just hype have been replaced by questions of how to get the benefits with the least amount of pain. Object oriented techniques have been around for some time, but this exploding popularity seems a bit unusual. Why the sudden interest? All kinds of explanations have been offered. In truth, there is probably no single reason. Probably, a combination of factors has finally reached critical mass and things are taking off. Nevertheless, it seems that C++ itself is a major factor in this latest phase of the software revolution. Again, there are probably a number of reasons why, but I want to suggest an answer from a slightly different perspective: C++ has become popular because it makes it easier to design software and program at the same time.

https://wiki.c2.com/?WhatIsSoftwareDesign

¿Qué es Diseño?

Descripción, **gráfico** o **bosquejo en papel** relacionado con la cosa que se está diseñando, **destinado a su construcción**

LONE STAR
RUBY CONFERENCE


Assessment
essmentId
eDate
axMark
Attempt
mark
dateSubmitted
comment
submits
0..*
1
If only one attempt is allowed per assessment, then the association here would be 0..1

```
_case_info(options)
ta[:example_group].update(options)

st_info(options)
etadata_for_next = options

method_added(id)
ame = id.to_s
caller_lines[name] = caller
if test_method?(name)
  test_method_metadata[name] = @_metadat
  @_metadata_for_next = nil
end
end

def examples
  @tc_examples ||= ExamplesCollection.new(
end
```

2010
* rough cut *

¿Qué es Diseño?

Diseño es la
definición que usamos para **construir**

LONE STAR
RUBY CONFERENCE

```
tadata[:example_group][:test_unit] =

_case_info(options)
ta[:example_group].update(options)

st_info(options)
etadata_for_next = options

method_added(id)
name = id.to_s
caller_lines[name] = caller
if test_method?(name)
  test_method_metadata[name] = @_m
  @_metadata_for_next = nil
 end
end

def examples
  @tc_examples ||= ExamplesColle
end
```

2010
* rough cut *

¿Dónde está expresado el Diseño de Software?

¿Qué es lo que construimos?

¡Software ejecutable!

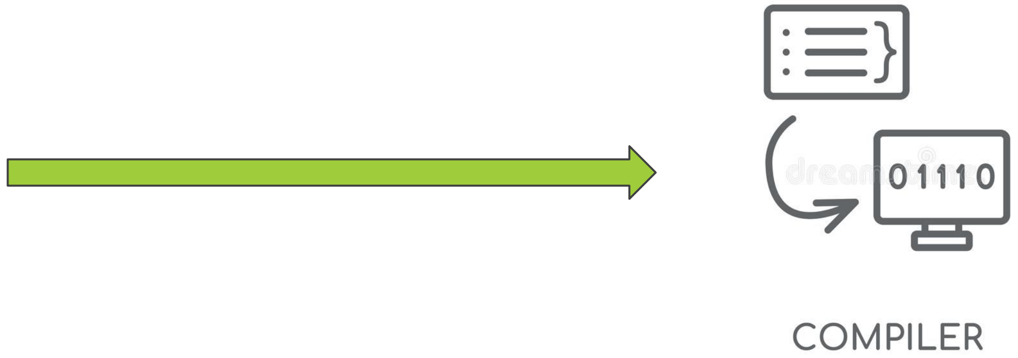
¿Qué es lo que usamos para construirlo?
¿Qué nos permite obtener Software ejecutable?

¡Código Fuente!

Código Fuente = Diseño de Software

Programar es Diseñar

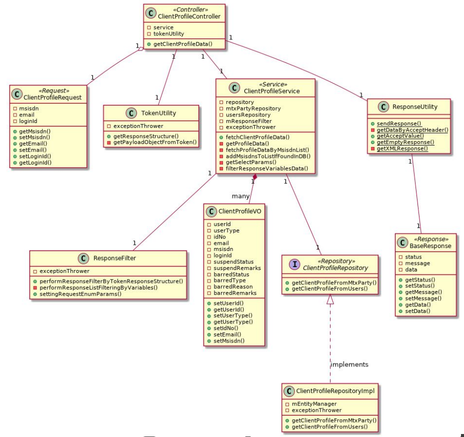
Diseñar es Programar



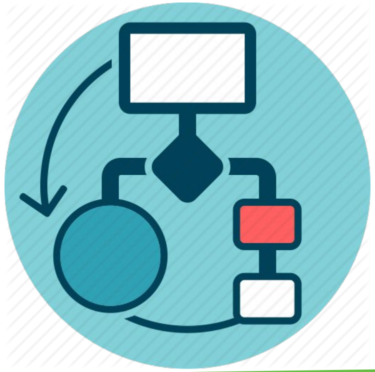
Nuestros “Constructores” son los Compiladores

Testear y **Debuggear** son actividades de **Diseño**

(validación y refinamiento de un diseño)



¿Qué papel juegan los “diagramas de diseño”? (Diagrama de Clases, de secuencia, etc)



Visualizar el Diseño
Pero no son el Diseño

¿Por qué nos cuesta estimar?

¿Por qué es difícil estimar?

- Descubrir vs. Entregar
- Estimar es difícil porque no estimamos **Cómo Construir** sino **Cómo Diseñar**

¿Que etapa cuesta más?

LONE STAR
RUBY CONFERENCE

```
tadata[:example_group][:test_unit] =

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st_info(options)
etadata_for_next = options

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  test_method_metadata[name] = @_m
  @_metadata_for_next = nil
end
end

def examples
  @tc_examples ||= ExamplesColle
end
```
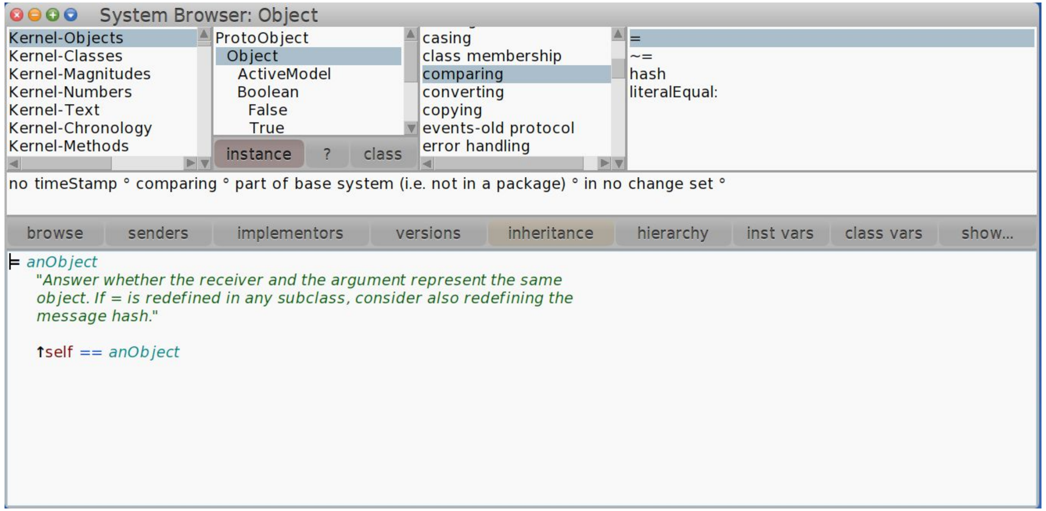
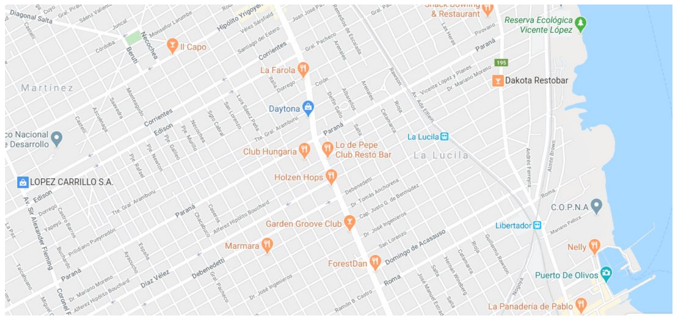

2010
*** rough cut ***

Característica fundamental: Paso del Tiempo en el Modelo



no timeStamp ° comparing ° part of base system (i.e. not in a package) ° in no change set °

```
= anObject
	"Answer whether the receiver and the argument represent the same
	object. If = is redefined in any subclass, consider also redefining the
	message hash."

	↑self == anObject
```



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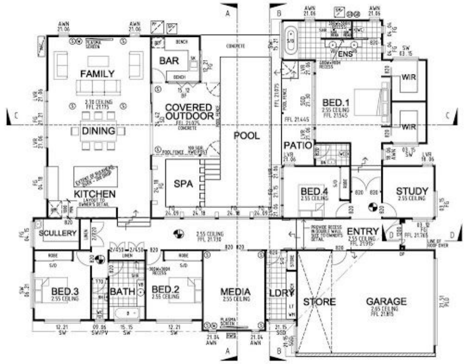
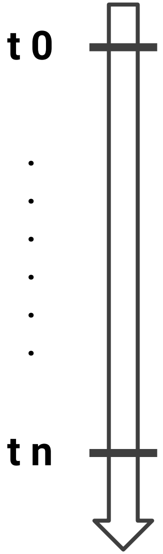
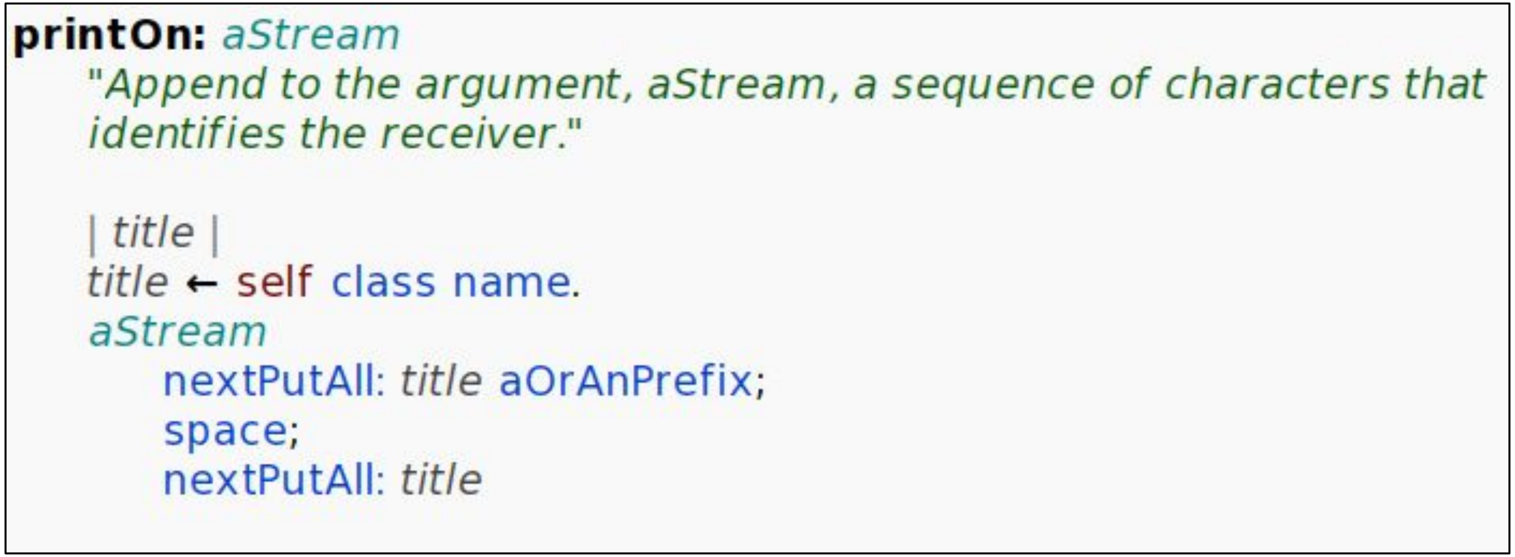


Es Dinámico - El tiempo transcurre





```
printOn: aStream
	"Append to the argument, aStream, a sequence of characters that
	identifies the receiver."

	| title |
	title ← self class name.
	aStream
		nextPutAll: title aOrAnPrefix;
		space;
		nextPutAll: title
```

Aquello representado por el modelo cambia

Plano de Arquitectura = Una casa

Software = Qué es una casa

Conclusiones

- El modelo está expresado en el código fuente
  - Los diagramas no son el modelo computable
  - La documentación no son el modelo computable

Conclusiones

- No es fácil estimar el “diseño”
  - Tenemos que estimar el diseño
  - Implica estimar “descubrir”
  - No estimamos construir

Conclusiones

- La “construcción” no cuesta nada, los costoso es el diseño
  - Crear el “ejecutable” a partir del diseño es lo que hacen los compiladores

Conclusiones

- ➢ Un “modelo computable” implica “ejecución”
- ➢ Ejecución implica “paso del tiempo”
- ➢ Hay que tener mucho cuidado al comparar nuestros modelos con los de otras profesiones