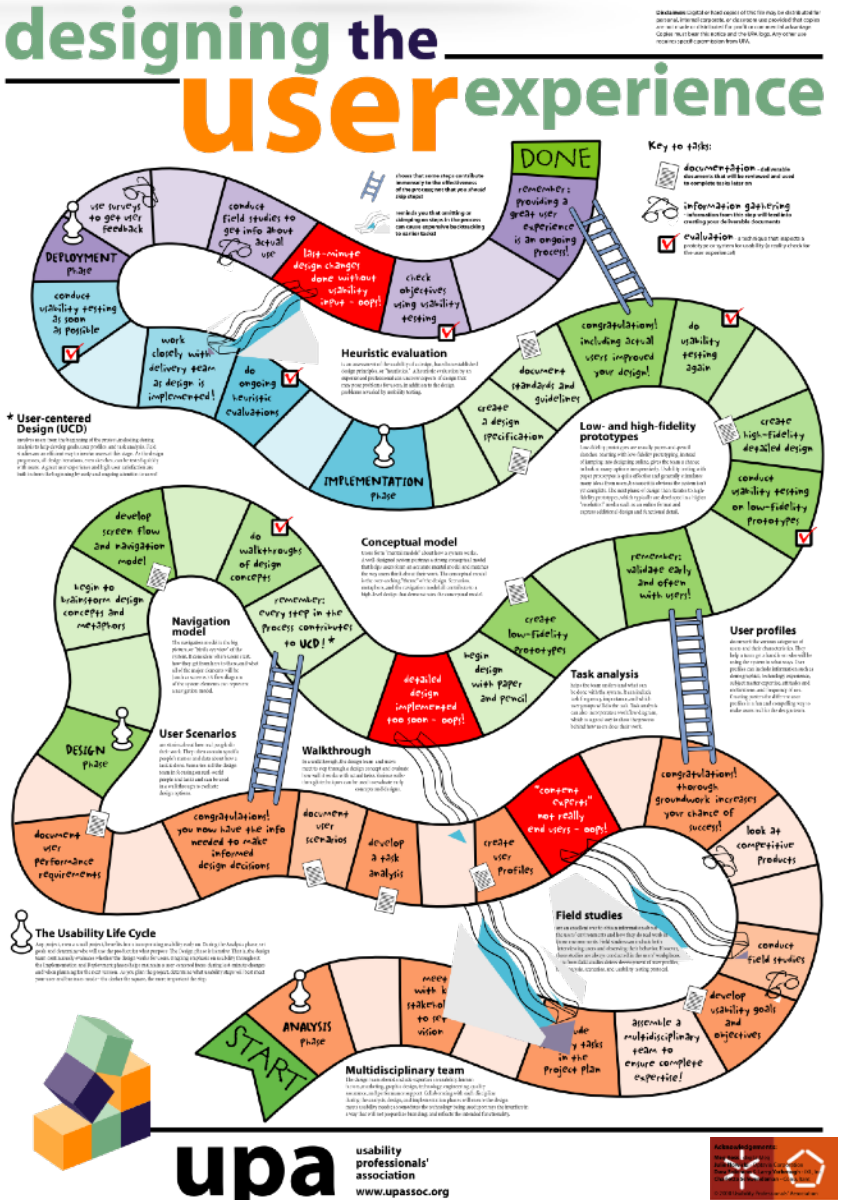
Módulo 5

ANÁLISE E MODELAÇÃO DE TAREFAS

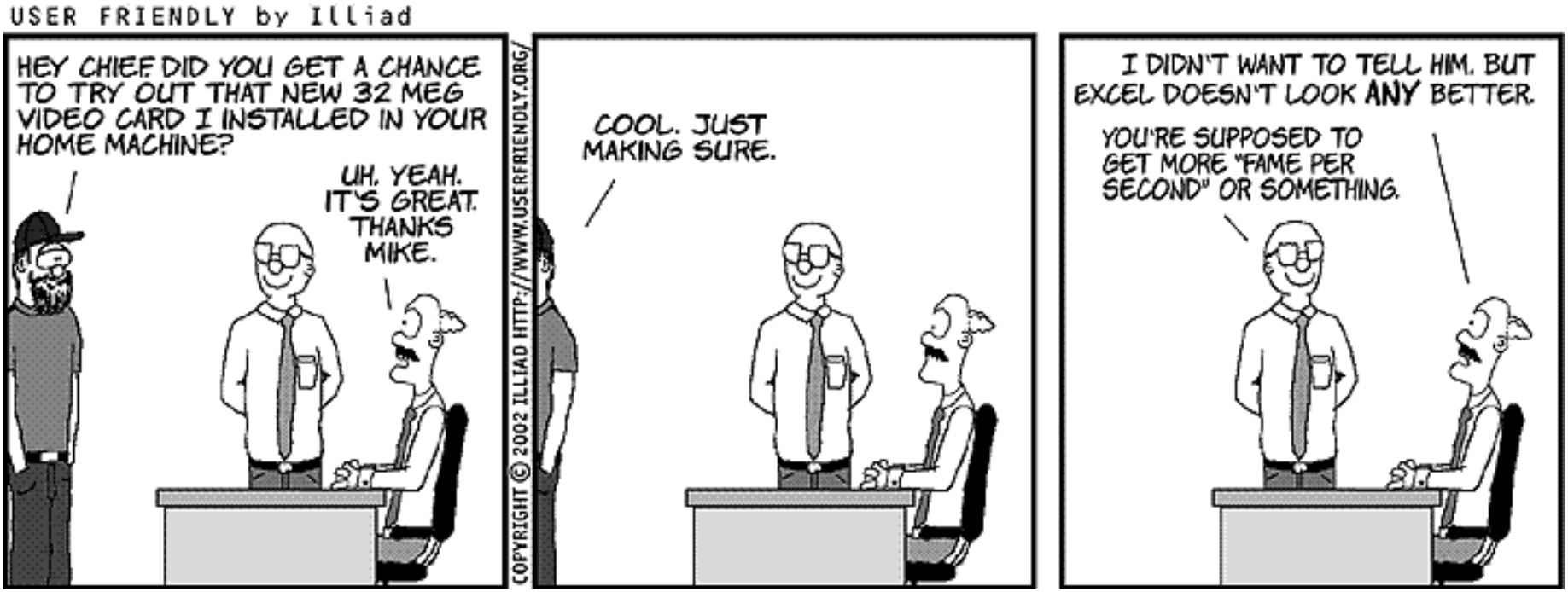
Abordagem centrada no utilizador

- Análise de requisitos
  - conhecer os utilizadores ✓
  - análise de tarefas
- Concepção
  - prototipagem
  - padrões de desenho
  - técnicas de avaliação
- Desenvolvimento
  - arquitecturas software
  - tecnologias de programação de interfaces
  - técnicas de avaliação
- Deployment
  - obter informação sobre utilização do sistema
  - avaliar resultado face a objectivos



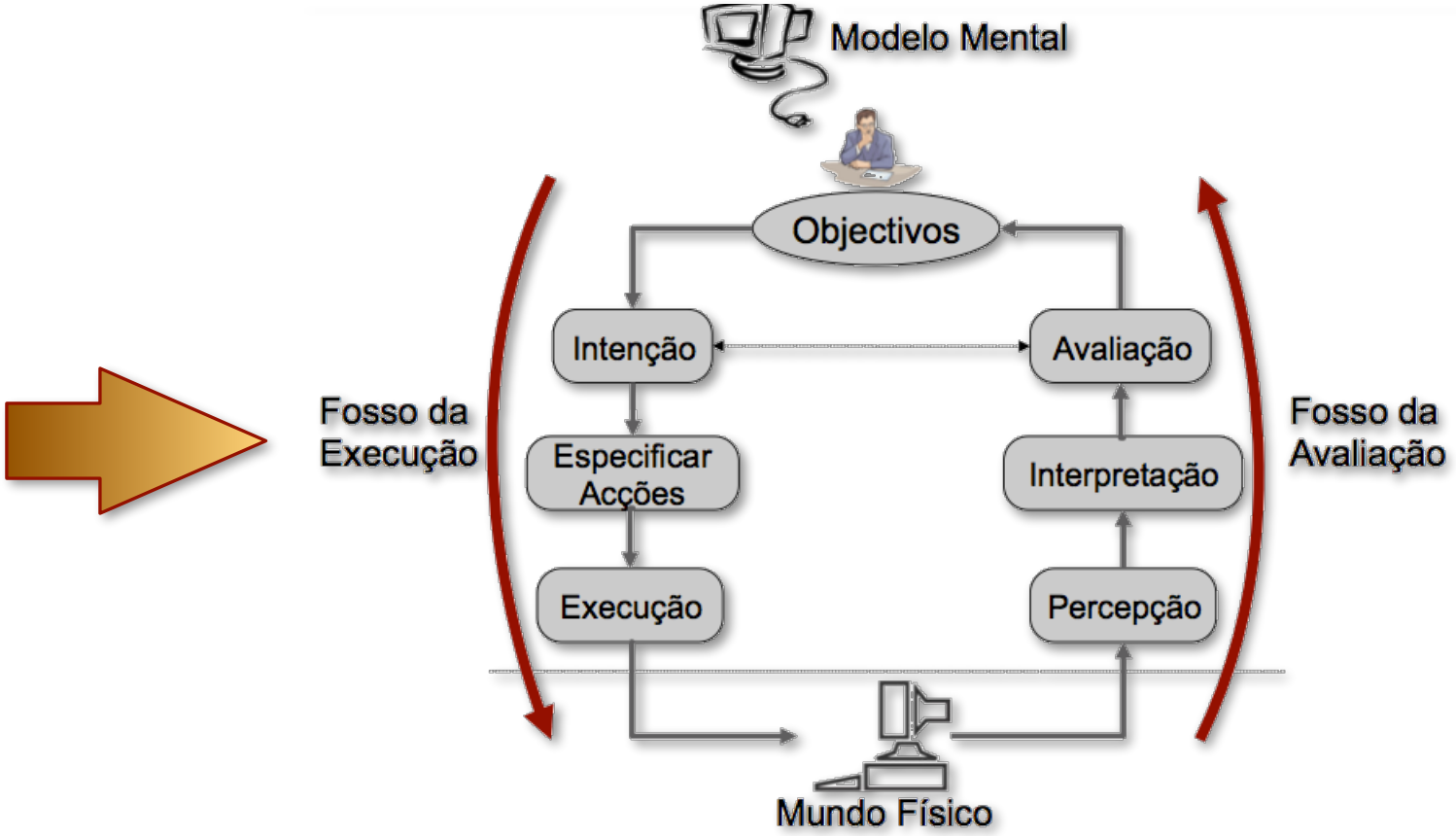
Relevância das tarefas

- Os sistemas existem para os utilizadores, não o contrário

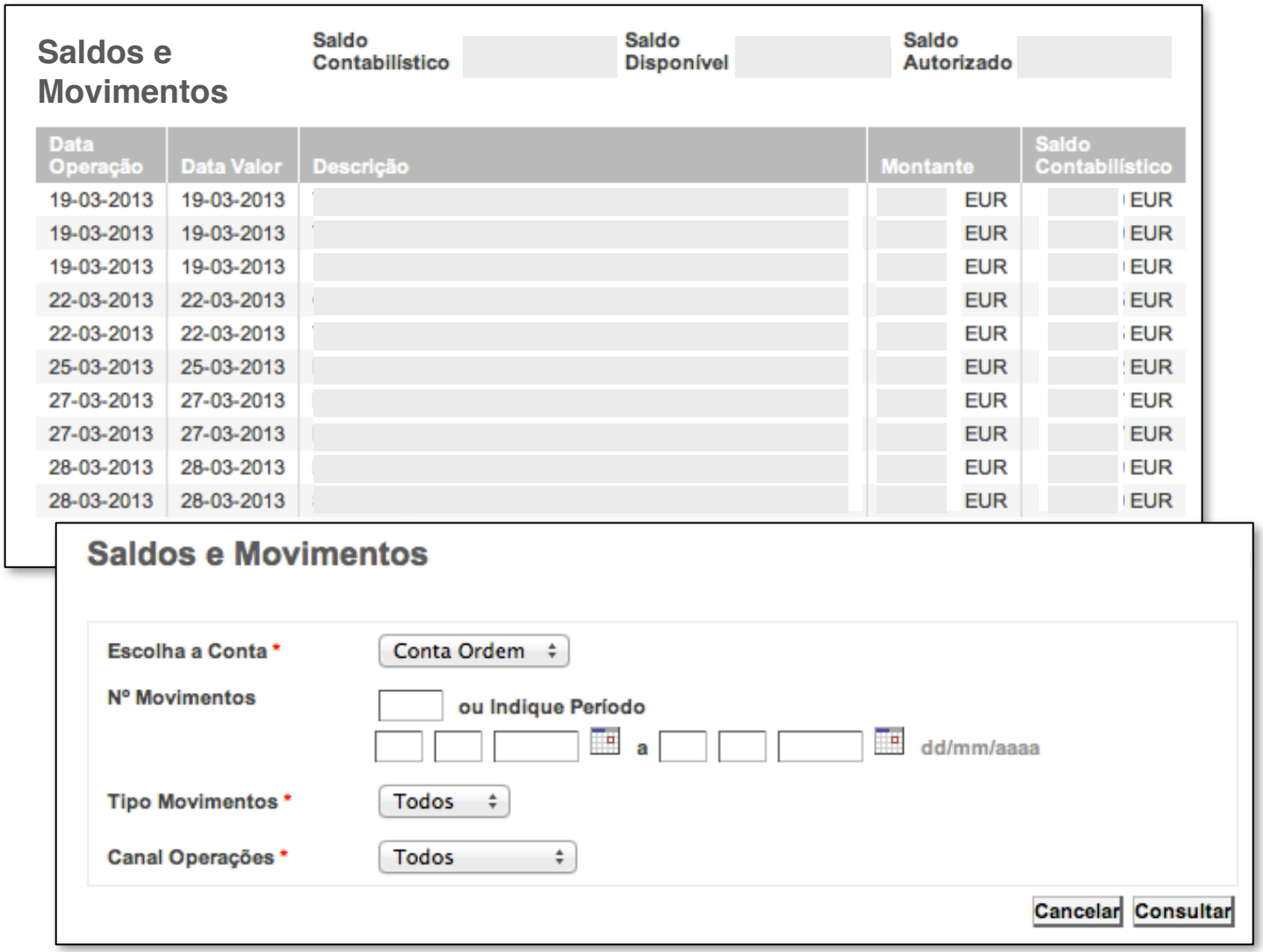


Relevância das tarefas

- Pensar no *Fosso da Execução*



Relevância das tarefas - um exemplo...



Saldos e Movimentos

Saldo Contabilístico | Saldo Disponível | Saldo Autorizado

Data Operação	Data Valor	Descrição	Montante	Saldo Contabilístico
19-03-2013	19-03-2013		EUR	EUR
19-03-2013	19-03-2013		EUR	EUR
19-03-2013	19-03-2013		EUR	EUR
22-03-2013	22-03-2013		EUR	EUR
22-03-2013	22-03-2013		EUR	EUR
25-03-2013	25-03-2013		EUR	EUR
27-03-2013	27-03-2013		EUR	EUR
27-03-2013	27-03-2013		EUR	EUR
28-03-2013	28-03-2013		EUR	EUR
28-03-2013	28-03-2013		EUR	EUR

Saldos e Movimentos

Escolha a Conta * Conta Ordem

Nº Movimentos ou Indique Período

a dd/mm/aaaa

Tipo Movimentos * Todos

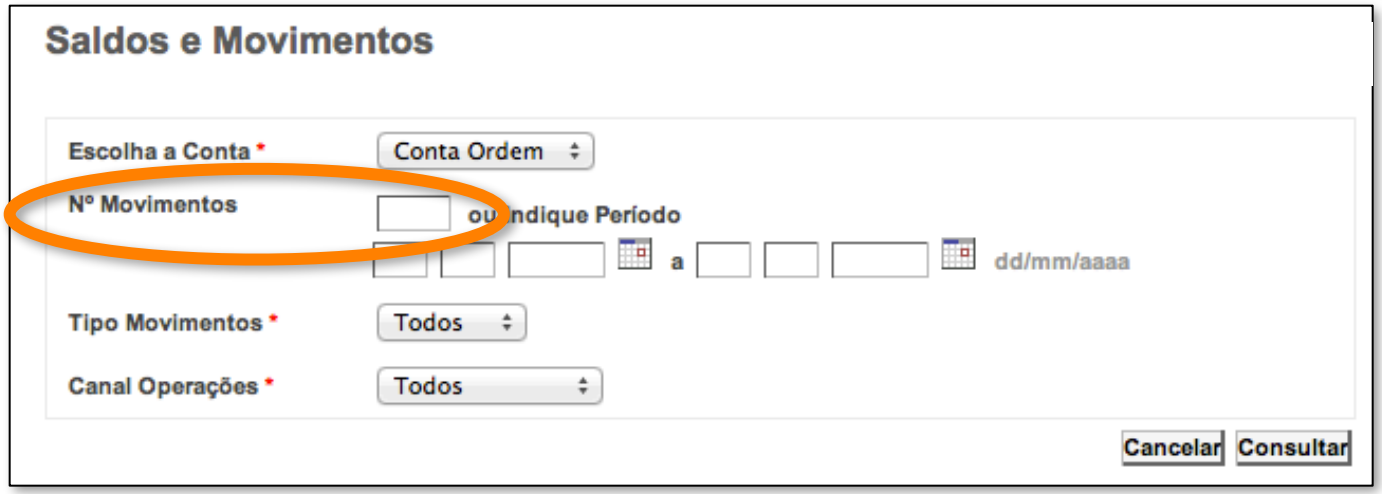
Canal Operações * Todos

Cancelar Consultar

!?

MPBBMPBBMPBBMP
BBMPBBPBB

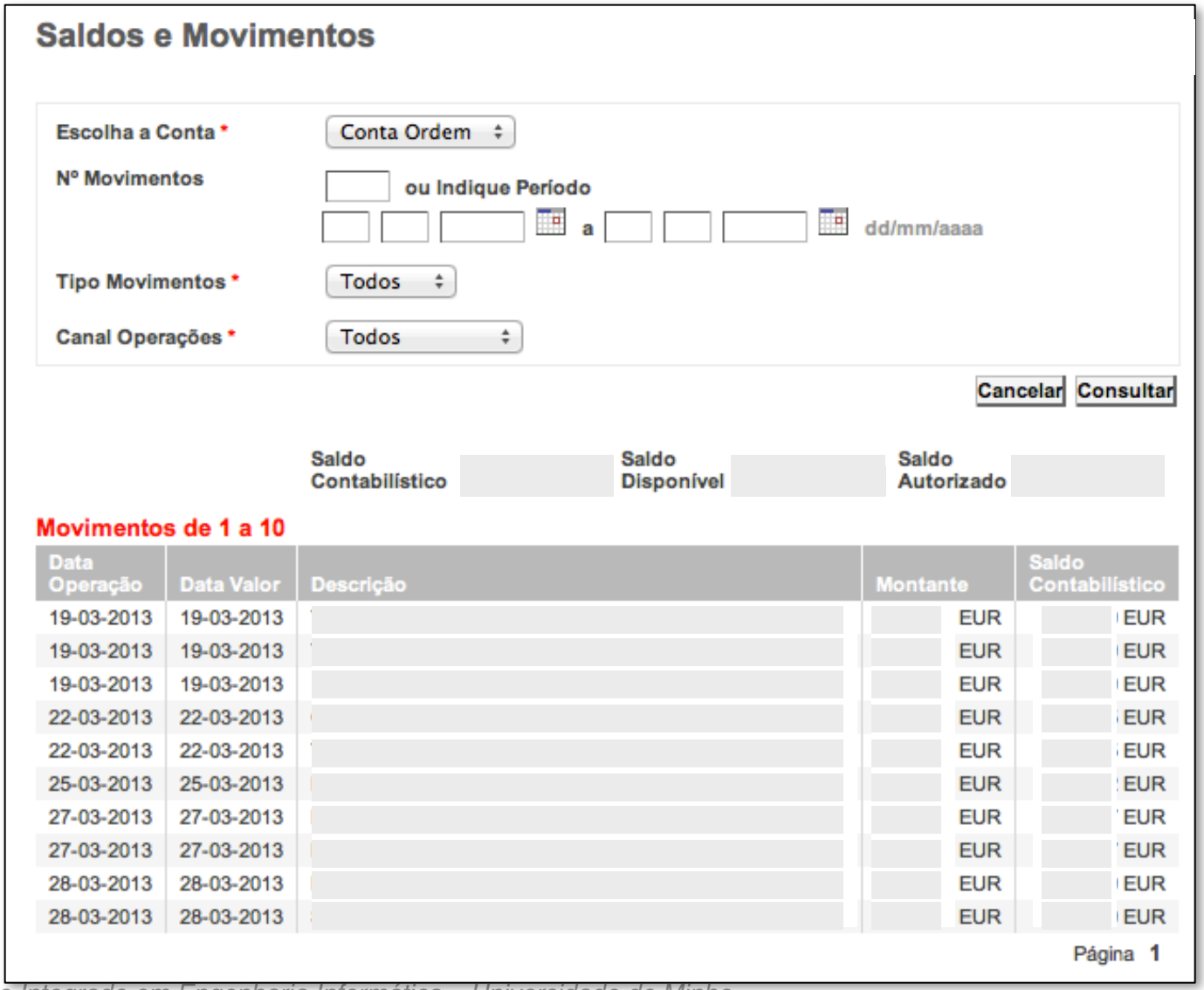
Relevância das tarefas - um exemplo...



Primeira tentativa!

MPBBMPBBKKPBB

Relevância das tarefas - um exemplo…



Saldos e Movimentos

Escolha a Conta * Conta Ordem

Nº Movimentos ou Indique Período

dd/mm/aaaa a dd/mm/aaaa

Tipo Movimentos * Todos

Canal Operações * Todos

Cancelar Consultar

Saldo Contabilístico | Saldo Disponível | Saldo Autorizado

Movimentos de 1 a 10

Data Operação	Data Valor	Descrição	Montante	Saldo Contabilístico
19-03-2013	19-03-2013		EUR	EUR
19-03-2013	19-03-2013		EUR	EUR
19-03-2013	19-03-2013		EUR	EUR
22-03-2013	22-03-2013		EUR	EUR
22-03-2013	22-03-2013		EUR	EUR
25-03-2013	25-03-2013		EUR	EUR
27-03-2013	27-03-2013		EUR	EUR
27-03-2013	27-03-2013		EUR	EUR
28-03-2013	28-03-2013		EUR	EUR
28-03-2013	28-03-2013		EUR	EUR

Página 1

Facilitar a utilização mais comum…

MPBB

!

Relevância das tarefas - um exemplo...

Seleccione uma Conta Conta Ordem

Saldo Contabilístico	Saldo Disponível	Saldo Autorizado

Últimos Movimentos

Data Operação	Data Valor	Descrição	Montante	Saldo Contabilístico
23-02-2018	23-02-2018			
23-02-2018	23-02-2018			
23-02-2018	23-02-2018			
23-02-2018	23-02-2018			
23-02-2018	23-02-2018			
23-02-2018	23-02-2018			
19-02-2018	19-02-2018			
14-02-2018	14-02-2018			
14-02-2018	14-02-2018			
09-02-2018	09-02-2018			

Mais Movimentos >>

Solução final...

(back to the future)

Saldos e Movimentos

Escolha a Conta * Conta Ordem

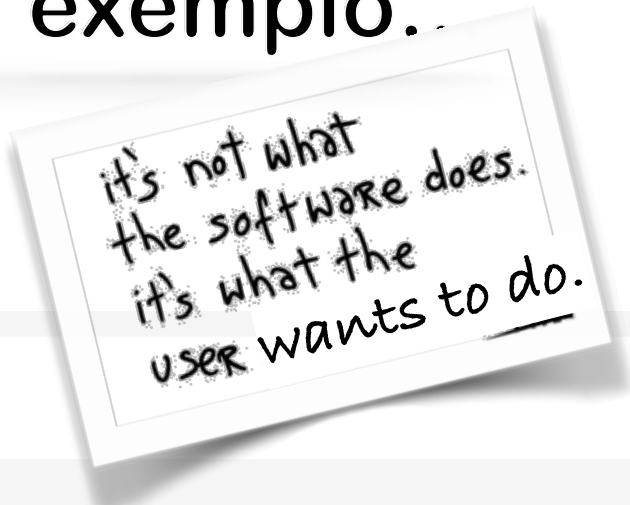
Nº Movimentos ou Indique Período a dd/mm/aaaa

Tipo Movimentos * Todos

Canal Operações * Todos

Cancelar Consultar

Relevância das tarefas - um exemplo..



Conta

Saldos e Movimentos (EUR) **Contabilístico:** **Cativo:** **Disponível:** **Autorizado:**

DATA OPERAÇÃO	DATA VALOR	TIPO	DESCRIÇÃO	DÉBITO	CRÉDITO	SALDO CONTROLO
2016-03-08	2016-03-08	LEV			-	
2016-03-07	2016-03-07	LEV			-	
2016-03-06	2016-03-06	TPA			-	
2016-03-05	2016-03-06	DEB			-	
2016-03-05	2016-03-06	DEB			-	

+ Movimentos

Ainda mais simples! (+10, +10, ...)

Outro exe

CS–25 BOOK 1

SUBPART F – EQUIPME

GENERAL

CS 25.1301 Function and installation
(See AMC 25.1301)

Each item of installed equipment must –

(a) Be of a kind and design appropriate to its intended function;

(b) Be labelled as to its identification, function, or operating limitations, or any applicable combination of these factors. (See AMC 25.1301(b).)

(c) Be installed according to limitations specified for that equipment.

[Amdt. No.:25/2]

CS 25.1302 Installed systems and equipment for use by the flight crew
(See AMC 25.1302)

This paragraph applies to installed equipment intended for flight-crew members' use in the operation of the aeroplane from their normally seated positions on the flight deck. This installed equipment must be shown, individually and in combination with other such equipment, to be designed so that qualified flight-crew members trained in its use can safely perform their tasks associated with its intended function by meeting the following requirements:

(a) Flight deck controls must be installed to allow accomplishment of these tasks and information necessary to accomplish these tasks must be provided.

(b) Flight deck controls and information intended for flight crew use must:

(1) Be presented in a clear and unambiguous form, at resolution and precision appropriate to the task.

(2) Be accessible and usable by the flight crew in a manner consistent with the urgency, frequency, and duration of their tasks, and

(3) Enable flight crew awareness, if awareness is required for safe operation, of the effects on the aeroplane or systems resulting from flight crew actions.

(c) Operationally-relevant behaviour of the installed equipment must be:

(1) Predictable and unambiguous, and

1–F–1

European Aviation Safety Agency

Certification Specifications for Large Aeroplanes

CS-25

Amendment 4
27 December 2007

Outro exemplo...

GENERAL

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(c) Operationally-relevant behaviour of the installed equipment must be:

(1) Predictable and unambiguous, and

(2) Designed to enable the flight crew to intervene in a manner appropriate to the task.

(d) To the extent practicable, installed equipment must enable the flight crew to manage errors resulting from the kinds of flight crew interactions with the equipment that can be reasonably expected in service, assuming the flight crew is acting in good faith. This sub-paragraph (d) does not apply to skill-related errors associated with manual control of the aeroplane.

[Amdt. No.:25/3]

CS 25.1303 Flight and navigation instruments

(a) The following flight and navigation instruments must be installed so that the instrument is visible from each pilot station:

(1) A free-air temperature indicator or an air-temperature indicator which provides indications that are convertible to free-air temperature.

(2) A clock displaying hours, minutes, and seconds with a sweep-second pointer or digital presentation.

(3) A direction indicator (non-stabilised magnetic compass).

(b) The following flight and navigation instruments must be installed at each pilot station:

(1) An airspeed indicator. If airspeed limitations vary with altitude, the indicator must have a maximum allowable airspeed indicator showing the variation of V_{MO} with altitude.

(2) An altimeter (sensitive).

(3) A rate-of-climb indicator (vertical speed).

(4) A gyroscopic rate of turn indicator combined with an integral slip-skid indicator (turn-and-bank indicator) except that only a slip-skid indicator is required on aeroplanes with a third attitude instrument system usable through flight attitudes of 360° of pitch and roll, which is powered from a source independent of the electrical generating system and continues reliable operation for a minimum of 30 minutes after total failure of the electrical generating system, and is installed in accordance with CS 25.1321 (a).

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Conhecer as tarefas

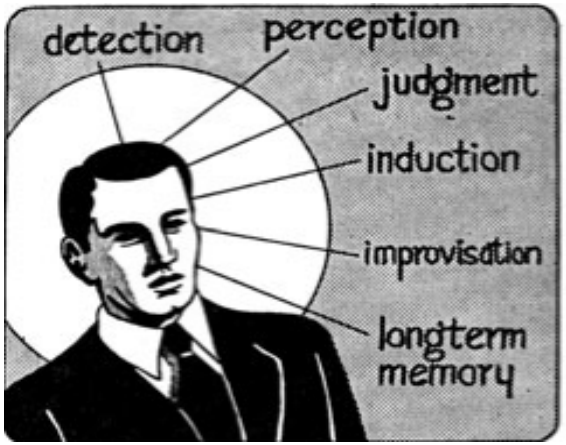
- Tarefa
  - Actividade humana que permite atingir um objectivo
- Análise de tarefas
  - Um método para analisar *actividade humana* (as tarefas!)
  - O que as pessoas fazem (e como fazem)
  - Com que objectos trabalham (cf. Modelo de Domínio)
  - O que necessitam saber

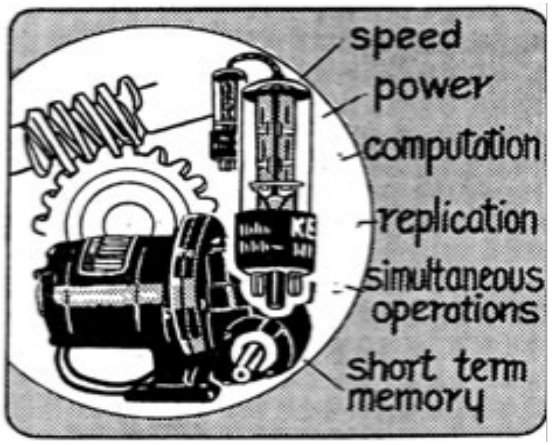
Analisar as actividades dos utilizadores

- Métodos
  - Entrevistas
  - Observação
  - Documentação existente*
  - Cenários / *Personae*
  - Atenção – considerar todos os *stakeholders*!
- Identificar oportunidades para introdução da tecnologia
  - Decidir o que vai ser responsabilidade da tecnologia e o que vai ser responsabilidade dos utilizadores – alocação de funções
  - Alocação pode ser dinâmica!

Alocação de funções – Fitts List

Fitts PM (ed) (1951) *Human engineering for an effective air navigation and traffic control system*. National Research Council, Washington, DC





MABA – MABA
Men Are Better At – Machines Are Better At

●	Speed	●
●	Memory	●
●	Sensing	●
●	Perceiving	●
●	Reasoning	●
●	Consistency	●
●	Computation	●
●	Power Output	●
●	Information Capacity	●

Hierarchical Task Analysis (HTA)

- Abordagem:
  1. identificar o objectivo do(s) utilizador(es)
  2. descrever as acções do(s) utilizador(es)
  3. estruturá-las numa hierarquia de tarefas e sub-tarefas
  4. descrever a ordem de execução

- Forma mais comum de análise de tarefas
- Outras:
  - Baseada em Conhecimento – analisar o que o utilizador sabe sobre a tarefa e como organiza essa informação
  - Baseada em relações Entidade/Objecto – analisar relações entre objectos, acções e utilizadores

Um exemplo

- Para limpar a casa — Objectivo
  - Ir buscar aspirador
  - Limpar as divisões
  - Quando o saco estiver cheio, esvaziá-lo
  - Arrumar o aspirador e acessórios

  } Actividades (Processo?)

- Temos que ter / conhecer:
  - aspirador, acessórios, saco do aspirador, armário, salas, etc. — Inputs
- Obtemos:
  - Um casa limpa — Outputs

Descrição HTA textual

Descrição hierárquica…

0. para limpar a casa
   1. ir buscar o aspirador
   2. limpar as divisões
      - 2.1. limpar a entrada
      - 2.2. limpar a sala
      - 2.3. limpar os quartos
   3. esvaziar o saco
   4. arrumar o aspirador e acessórios

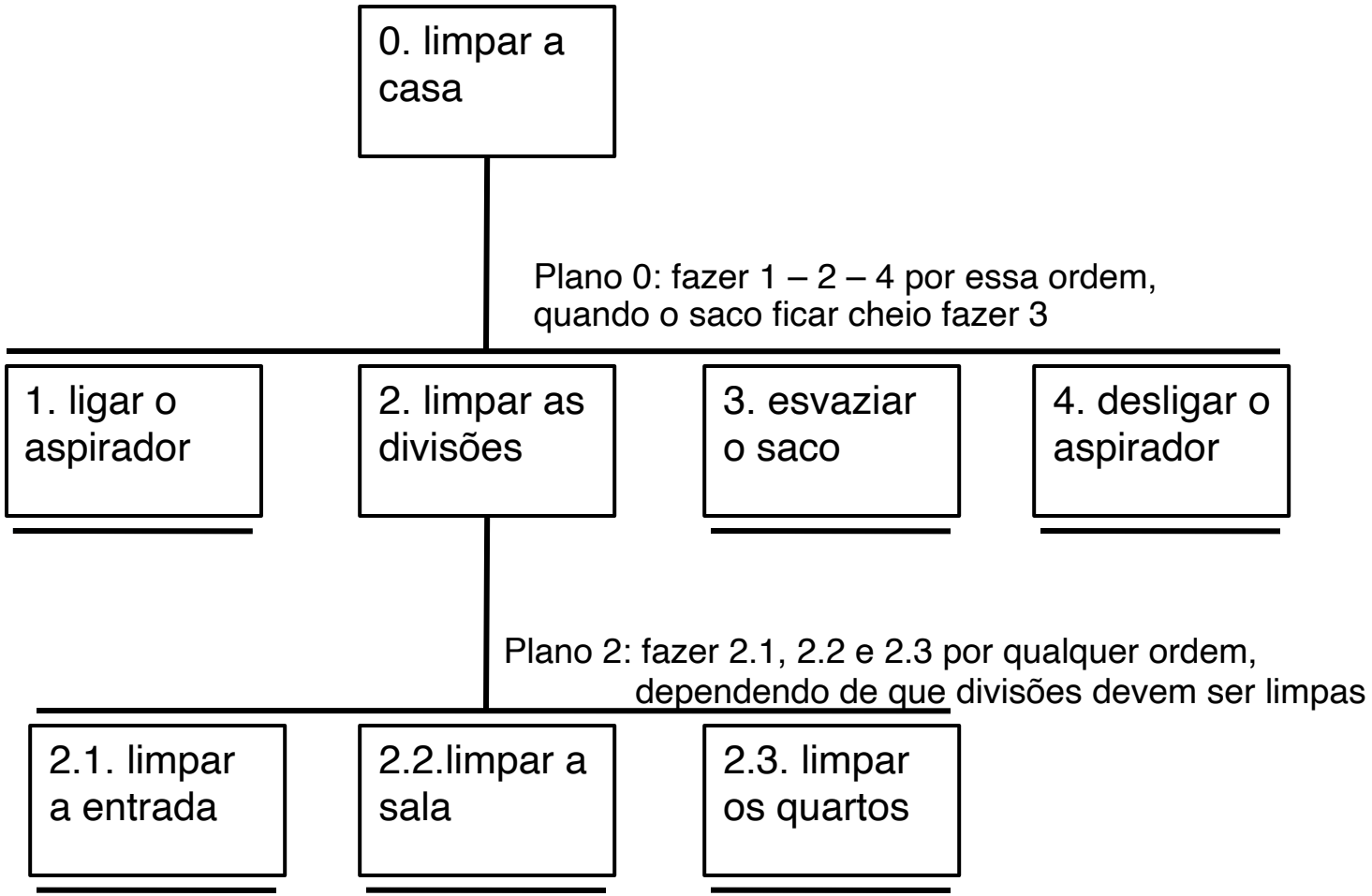
… e planos

Plano 0: fazer 1 – 2 – 4 por essa ordem, quando o saco ficar cheio fazer 3

Plano 2: fazer 2.1, 2.2 e 2.3 por qualquer ordem dependendo de que divisões devem ser limpas

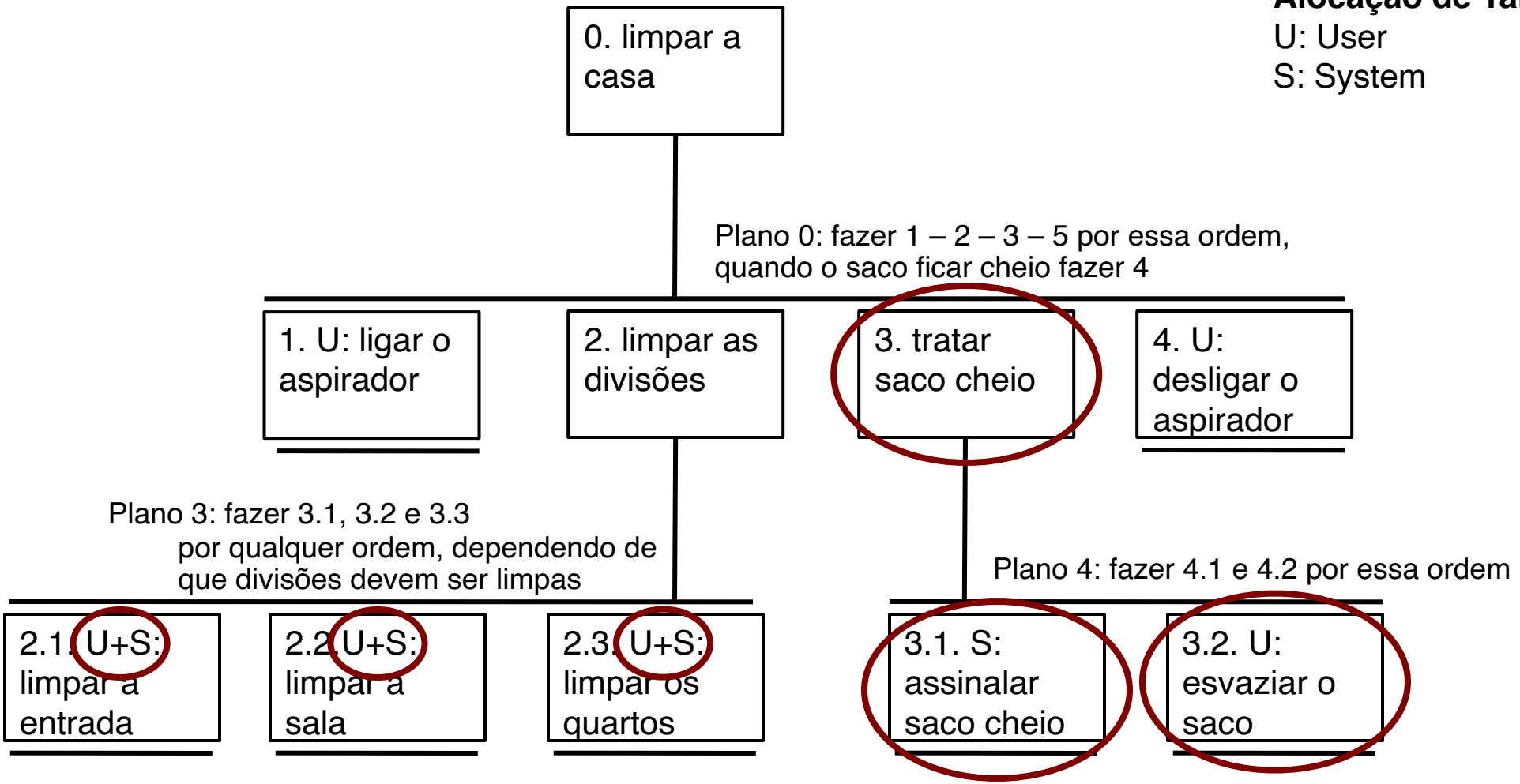
N.B. apenas os planos denotam ordem

Descrição HTA em Diagrama



Descrição HTA em Diagrama

Alocação de Tarefas:
U: User
S: System



Método genérico

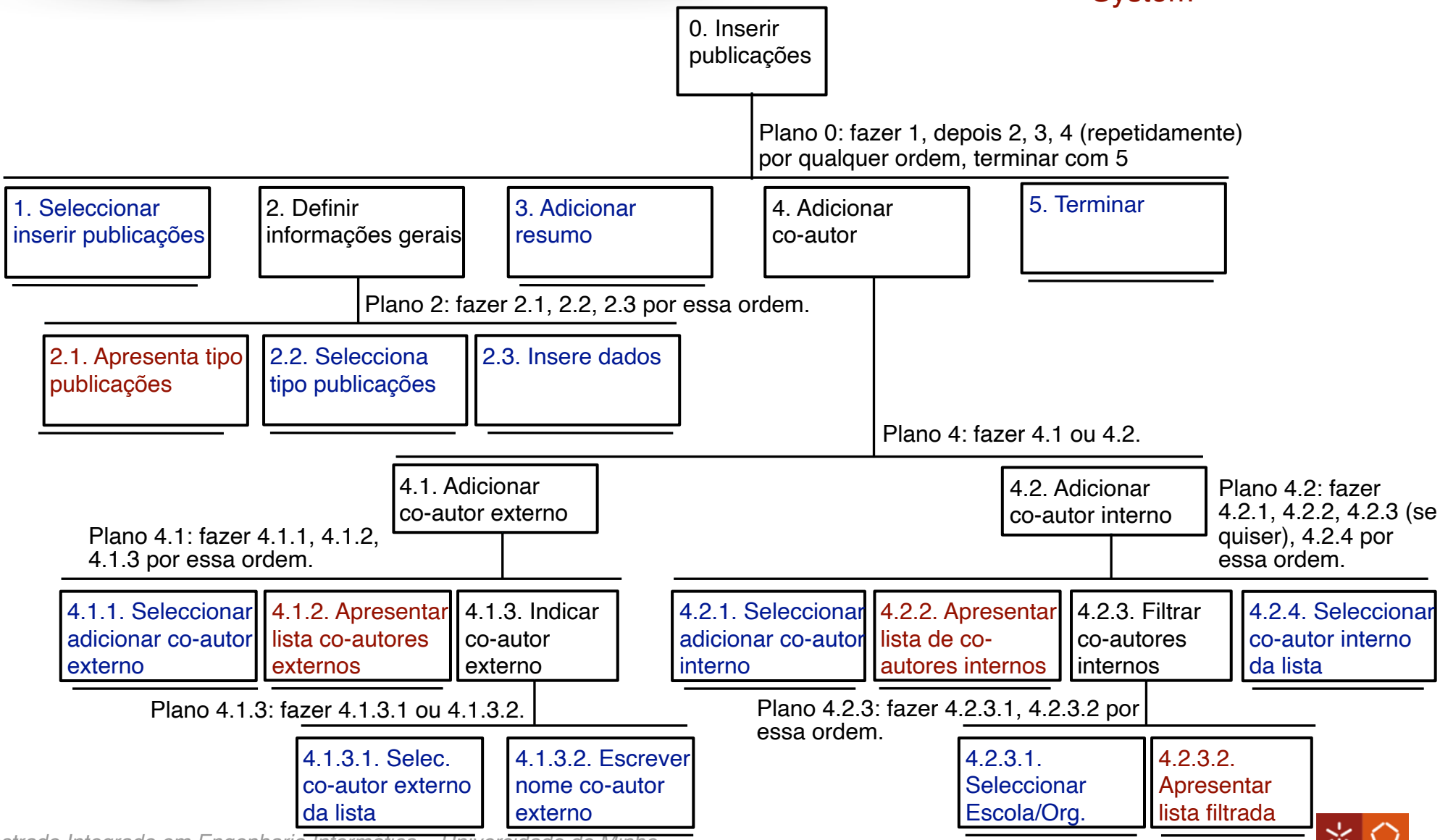
1. Observar / entrevistar
2. Capturar lista de palavras e acções (sem estrutura)
3. Organizar na notação de escolha
   - agrupar tarefas em tarefas de mais alto nível
   - decompor tarefas em sub-tarefas mais específicas

Regras de paragem – Quando parar?

- "limpar a entrada" suficientemente simples?
- Objectivo: Expandir apenas tarefas relevantes
- Nível de detalhe limite: acções motoras

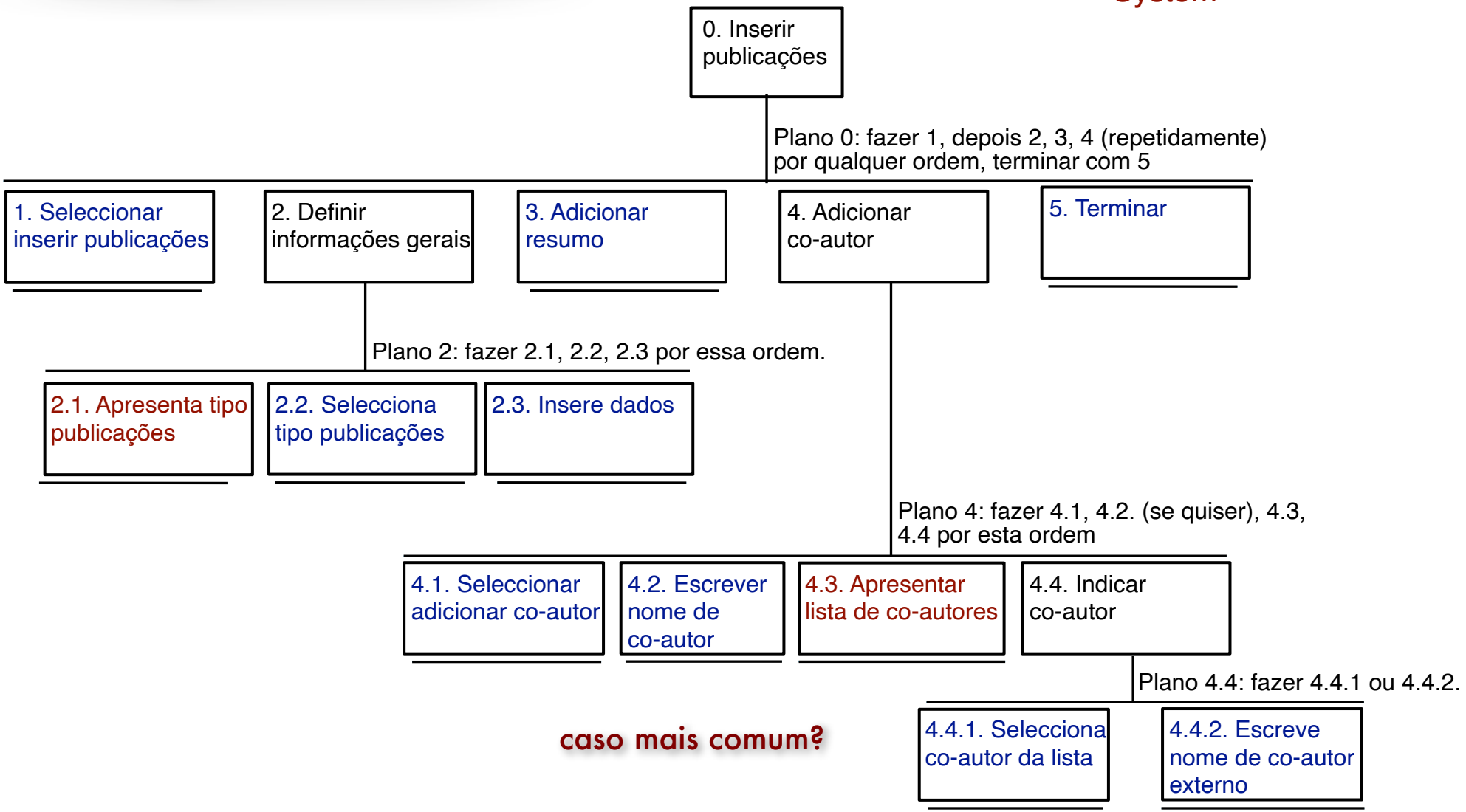
Registar referências

Alocação de Tarefas:
User
System



Simplificando…

Alocação de Tarefas:
User
System



caso mais comum?

Análise de tarefas vs. Outras técnicas

Análise de Tarefas	**vs.**	**Use Cases**
O Utilizador	- focus -	O Sistema
Como o Utilizador trabalha	- focus -	Como o Sistema é utilizado

Análise de Tarefas	**vs.**	**Modelos Cognitivos**
Acções externas (visíveis)	- focus -	Estado mental interno
O *trabalho*	- focus -	Acções 'atómicas'

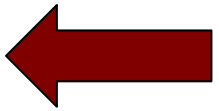
Utilidade – requisitos & design

- Captura de requisitos e *design* do sistema
  - lifts focus from system to use
  - suggests candidates for automation
  - uncovers user's conceptual model

- *Design* detalhado da interface
  - Task structure suggests menu layout / available options
  - task frequency guides default choices
  - existing task sequences guide dialogue design

NOTE:

- rigid task based design ⇒ inflexible system



Resumo – Análise de Tarefas

1. Estudar objectivos e tarefas existentes.
2. Definir tarefas no novo sistema.
   - Tarefas devem ser:
     - Eficazes – minimizar o “esforço” (do utilizador)
     - Compreensíveis – conformes ao que o utilizador espera
     - Satisfatórias – em grande medida, o resultado das duas acima