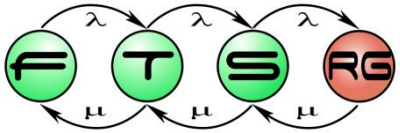
Home Assignment

System Modeling

Fall 2016.



Home Assignment Phases

1. Choose a system to model
2. Compile a specification
3. Build process model

23th October

4. Submit whole project

4th December

5. „Defend” your work face-to-face

Keep in mind

- Deadlines are strict!
  - Sunday midnight
  - Missed → will be processed as a late submission
- Read carefully
  - The detailed HW assignment rules
  - The tips & tricks doc
- „Cloned” work will be rejected

1. Choose a system to model

- We need a workflow model
- „Business item”: whose life are we modeling?
- Activities (≥10), resources (≥3)
- At least one decision point (branching)
- At least one loop OR a parallel section
- You will be assigned a *topic* from the field of IT…
  - … such as an on-line book store, etc. …
  - … but you have to work out details individually.
  - Model a computerized process, the goal is not BPM

2. Specification

- Approx. 1 page
  - ~2 paragraphs: what system is it?
    - roughly the things on the previous slide…
    - Must be understandable, to-the-point, sufficient
  - Identify model elements (tasks, resources, business items)
  - Declare what measurements will be performed
  - Which parameter will be analysed for sensitivity?
- Invalid specification → model won't be graded
  - If unsure, ask opponent before the building model **(preferably until the Wednesday before deadline)**

3. Build the model

- Modeling tool
  - IBM Websphere Business Modeler
    - We provide version 7.0 on virtual machines (VCL cloud)
    - Trial version can be downloaded (not recommended)
  - Or a different software…
    - …that has all required capabilities?
    - discuss with us beforehand
- Draw a „readable” workflow!
- Submit spec + model by: **2016-10-23 (Sunday)**
  - Finite cloud capacity → don’t leave for the last days

4. Measurements

- Final submission: specification + model +
- Measurements
  a. Sizing workload
  b. Global performance bound
  c. Finding and resolving bottlenecks
  d. Reliability modeling
  e. Sensitivity analysis
- Textual documentation for all of the above
- To be submitted by: **2016-12-04 (Sunday)**
  - Including all your work on the assignment

4a. Sizing relevant workflow

- How many process instances to start?
  - Pipeline filling up / draining may distort
  - Also to keep randomness at bay
- An upper limit is sufficient
- E.g.: we start 100 and then 300 tokens
  - Does resource utilization change significantly?
  - If not, 100 tokens will be enough
- Also pay attention to intensity of workload

4b. Global performance bound

- Unlimited resources
- Roundtrip time
- Will perform no better under realistic conditions

4c. Bottlenecks

- Start with scarce resources
- Measure utilization
- Identify the bottleneck
- Increase (decrease) available resource pool
- Repeat from measuring...
- Until all resources utilizations are at 40-60%

4d. Reliability modeling

- (You will comprehend this after a lecture to come)
- Assign fault rate to resource
- „Cost” for a period of $T_0 = -\log(r(T_0)) = T_0/MTTF$
- Accumulated over the life of the process instance
- E.g. WinXP workstation
  - ~100h MTTF
  - 0.01 USD „cost” per hour

4e. Sensitivity

- Use a parameter selected in the specification
  - Resource reqirements of an important task
  - Decision probabilities
- How does performance vary by this parameter?

Further remarks

- Face-to-face discussion after submission („defense”)
- Consultation oppurtunity
  - We plan to host at least one such occasion
  - Tentative date: 1st Dec.
  - Details to emerge later

Recap

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