UNIVERSITÀ DI PISA

PROCESS-DRIVEN INFORMATION SYSTEMS

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CdS	COMPUTER ENGINEERING
Codice	686II
CFU	6

Moduli	Settore/i	Tipo	Ore	Docente/i
PROCESS-DRIVEN INFORMATION SYSTEMS	ING-INF/05	LEZIONI	60	MARIO GIOVANNI COSIMO ANTONIO CIMINO

Obiettivi di apprendimento

Conoscenze
The course aims to provide knowledge and experience essential for designing and developing enterprise information systems that are driven by workflow models. Such software systems mainly support the way that machines, people, work, activities, events, tools are arranged by collaborating organizations for efficiently delivering goods and services. Typical examples of process-driven information systems are Workflow Management Systems (WfMS), Document Management Systems (DMS), the process engines of software systems such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Supplier Relationship Management (SRM), Product Lifecycle Management (PLM), as well as the service orchestrators for enabling Ambient Intelligence and Enterprise Application Integration. Students are trained on how to model and develop non-trivial software systems with business process management suites.

Modalità di verifica delle conoscenze
oral presentation of the project and written/oral test

Programma (contenuti dell'insegnamento)

Workflow and dataflow modeling: BPMN execution semantics; determination of scenarios and calculation of the number of tokens; workflow models from informal specification; the semi-formal textual description; UML data object specification; guidelines on how to characterize a process from real world contexts; handoff, service and task levels; group exercises. Lab activities with a process drawing tool and a process modeling suite. *Business process simulation*: simulation parameters; process logs; benchmarks; KPIs; task duration; branching proportion; available resources; number of instances; arrival rate; resources allocation for task. Lab activities with a process simulation tool. *Process-driven architectures*: evolution of enterprise systems architectures; Enterprise Resource Planning architecture; siloed enterprise applications; integration architectures; multiple-application workflow systems architecture; human interaction workflow; service-oriented architectures; enterprise services; enterprise service bus; service composition. Labs activities with a Business Process Management suite. *Advanced process modeling*: errors in BPMN models; syntactical and structural errors; deadlock; livelock; multiple termination; sample patterns: loop deadlock, multi-source deadlock, improper structuring deadlock; message-related mismatch; counterexamples. Exercises. *Process mining*: process execution and event logs; automatic process discovery; alpha miner algorithm; robust process discovery; heuristics miner algorithm; fuzzy miner algorithm; performance analysis; conformance checking. Lab activities with a process mining suite.

Bibliografia e materiale didattico

1. T. Allweyer, D. Allweyer, *BPMN 2.0*, 2nd ed., BoD press, Norderstedt, 2010 [excerpt].
2. BPMN Movies (zipped swf, 5,9 MB)
3. Adobe Flash (swf) Player 10.2 (zip, 2,7 MB)
4. BPMN 2.0 Poster (pdf)
5. Visual Paradigm for UML 11 [Users Guide]
6. Signavio, Process Editor - User Manual, 2015 (see more on academic.signavio.com)
7. Disco User Guide
8. Bonita BPM User Guide
9. Bonita BPM Connectors Guide (see more on documentation.bonitasoft.com, community.bonitasoft.com)

Modalità d'esame

oral presentation of the project and written/oral test