THE DIVISIBILITY MODULO 4 OF KLOOSTERMAN SUMS OVER FINITE FIELDS OF CHARACTERISTIC 3
Changhyon Sin

Abstract. Recently Garashuk and Lisonek evaluated Kloosterman sums \( K(a) \) modulo 4 over a finite field \( \mathbb{F}_{3^m} \) in the case of even \( K(a) \). They posed it as an open problem to characterize elements \( a \) in \( \mathbb{F}_{3^m} \) for which \( K(a) \equiv 1 \pmod{4} \) and \( K(a) \equiv 3 \pmod{4} \). In this paper, we will give an answer to this problem. The result allows us to count the number of elements \( a \) in \( \mathbb{F}_{3^m} \) belonging to each of these two classes.

EXTENDING OBJECT-ORIENTED NETWORK PROTOCOLS VIA ALTERNATIVE TRANSPORTATION BINDINGS (WEB SERVICES OVER XMPP)
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Abstract. Distributed and/or composite web applications are driven by intercommunication via web services, which employ application-level protocols, such as SOAP. However, these protocols usually rely on the classic HTTP for transportation. HTTP is quite efficient for what it does—delivering web page content, but has never been intended to carry complex web service oriented communication.

Today there exist modern protocols that are much better fit for the job. Such a candidate is XMPP. It is an XML-based, asynchronous, open protocol that has built-in security and authentication mechanisms and utilizes a network of federated servers. Sophisticated asynchronous multi-party communication patterns can be established, effectively aiding web service developers.

This paper's purpose is to prove by facts, comparisons, and practical examples that XMPP is not only better suited than HTTP to serve as middleware for web service protocols, but can also contribute to the overall development state of web services.
DESIGNING AN E-MAIL PROTOTYPE TO ENHANCE EFFECTIVE COMMUNICATION AND TASK MANAGEMENT: A CASE STUDY

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Key words: Computer-Mediated-Communication (CMC), Computer Supported Cooperative Work (CSCW), e-mail design, Communication Breakdowns, Miscommunication, Contextualization, Mutual Understanding.

Abstract. This paper deals with communicational breakdowns and misunderstandings in computer mediated communication (CMC) and ways to recover from them or to prevent them. The paper describes a case study of CMC conducted in a company named Artigiani. We observed communication and conducted content analysis of e-mail messages, focusing on message exchanges between customer service representatives (CSRs) and their contacts. In addition to task management difficulties, we identified communication breakdowns that result from differences between perspectives, and from the lack of contextual information, mainly technical background and professional jargon at the customers’ side.

We examined possible ways to enhance CMC and accordingly designed a prototype for an e-mail user interface that emphasizes a communicational strategy called contextualization as a central component for obtaining effective communication and for supporting effective management and control of organizational activities, especially handling orders, price quoting, and monitoring the supply and installation of products.

SPECIFICS IN APPLYING AGILE SOFTWARE METHODOLOGIES IN PORTAL SOLUTIONS

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Key words: agile methodologies, XP, Scrum, ASD, FDD.

Abstract. Agile methodologies are becoming more popular in the software development process nowadays. The iterative development lifecycle, openness to frequent changes, tight cooperation with the client and among the software engineers are turning into more and more effective practices and respond to a higher extend to the current business needs. It is natural to raise the question which methodology is the most suitable for use when starting and managing a project. This depends on many factors—product characteristics, technologies used, client’s and developer’s experience, project type. A systematic analysis of the most common problems appearing when developing a particular type of projects—public portal solutions, is proposed. In the case at hand a very close interaction with various types of end users is observed. This is a prerequisite for permanent changes during the development and support cycles, which makes them ideal candidates for using an agile methodology. We will compare the ways in which each methodology addresses the specific problems arising and will finish with ranking them according to their relevance. This might help the project manager in choosing one or a combination of the methodologies.

MODERNIZING LEGACY PHYSICS APPLICATIONS FOR REUSE IN WEB AND SOA∗

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Key words: reengineering, wrapping, legacy software, JNI, SOA, BPEL, scientific workflows, web services.

∗This article presents the principal results of the doctoral thesis “Software system for computer simulation of metal vapor lasers” by Anna Malinova (Paisii Hilendarski University of Plovdiv), successfully defended before the Specialized Academic Council for Informatics and Mathematical Modelling on 2 November 2009. Additional research results and basic aspects of future development are also presented.
Abstract. This paper concerns the application of recent information technologies for creating a software system for numerical simulations in the domain of plasma physics and in particular metal vapor lasers. The presented work is connected with performing modernization of legacy physics software for reuse on the web and inside a Service-Oriented Architecture environment. Applied and described is the creation of Java front-ends of legacy C++ and FORTRAN codes. Then the transformation of some of the scientific components into web services, as well as the creation of a web interface to the legacy application, is presented. The use of the BPEL language for managing scientific workflows is also considered.