

# Student Software Engineering Projects for the Maemo Platform at Petrozavodsk State University: *State-of-the-Art and Perspective*

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**NOKIA**



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# Roadmap

- 1 Motivation and History
- 2 Software Engineering at PetrSU
- 3 PetrSU Maemo Projects
- 4 Conclusions



# Why IT and SE at PetrSU?

## Goeconomical factors

- Karelia is close to Europe Union as well as to St.-Petersburg and Moscow
- International collaboration in industry, education and research
- Karelia and its neighbors need specialists in IT, including software engineers



from The Official Site of the Administrative Bodies, Republic of Karelia, <http://www.gov.karelia.ru/>

## PetrSU mission

- The key institution at European North of Russia for "forging" such specialists: Innovations and IT park approach
- Active research and development in IT allow focusing on intellectual software (Mathematics, Algorithmics, System analysis)
- ACM programming contests and other competitions in IT



# Finnish—Russian Cooperation

**University of Helsinki** (Department of Computer Science): since 1993

- Annual Finnish Data Processing Week at PetrSU (FDPW): 1997
- Advances in Methods of Information and Communication Technology (AMICT): 2006 (*this year, 19.-20.5, welcome!*)
- Common Core of Working Study Program: 2001
- Joint student SE projects
- Double diploma



## Finnish Universities and Institutions

- FDPW and AMICT seminars
- Finnish—Russian Cross Border University (CBU): 2004
- Guest lecture courses
- Helsinki Institute for Information Technology (HIIT): 2005, joint research in networking



# Software Engineering Education

## Basic educational lines at Faculty of Mathematics

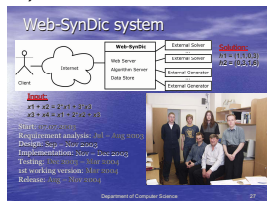
- Applied Mathematics and Computer Science (1993)
- Information Systems (2001)

## Curriculum

- Specialist (5 years), Bachelor+Master (4+2 years)
- ACM Computing Curricula (1991, 2001, 2005)
- University of Helsinki: Common Core of Working Study Program (since 2001)

## Student team projects: Initial (2003–2004)

- Scientific-centric project *Web-SynDic*,  
<http://websyndic.cs.karelia.ru/>
- Joint project *DaCoPan*  
(with University of Helsinki),  
<http://dacopan.cs.karelia.ru/>



## Basic Scheme

**Introduction:** at school, then 1st&2nd year students

- Linux environment
- SE elements in basic IT courses
- Specialization areas and optional courses
- PetrSU Programmer Club

```
Starting RPC portmap daemon
Master Resource Control: runlevel 3 has been

Rescue login: root
Rescue: # mkdir /tmp/sdb1
Rescue: # mount /dev/sdb1 /tmp/sdb1 -o ro
Rescue: # insmod /tmp/sdb1/ati2.ko
Rescue: # umount /tmp/sdb1
Rescue: # ifconfig eth0 192.168.112.201 netmask 255.255.0
Rescue: # ping 192.168.112.213
PING 192.168.112.213 (192.168.112.213) 56(64) bytes of data.
Rescue: # ping 192.168.112.213
64 bytes from 192.168.112.213: icmp_seq=1 ttl=64 time=2.43 ms
64 bytes from 192.168.112.213: icmp_seq=2 ttl=64 time=0.714 ms
64 bytes from 192.168.112.213: icmp_seq=3 ttl=64 time=0.500 ms

--- 192.168.112.213 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2802ms
rtt min/avg/max/ndev = 0.714/1.352/2.435/0.770 ms
Rescue: # _
```

**Basics:** 3rd year students

- Mandatory course *Software Engineering*
- Autumn semester: theory + miniprojects
- Spring semester: team projects close to real life

**Opening a door to real-life projects:** BSc, Diploma and MSc thesis

- Participation in research (PetrSU Departments)
- Regional Center of Information Technology (Natalia Ruzanova)
- PetrSU IT Park (Anatoly Voronin, Anton Shabaev)



# Student SE Project Organization

## Teams of 4–6 developers

- Rules of the play
- Manager
- 8–10 (wo)man-hours per week, 15 weeks

## Customer

- Faculty, IT park, Industry
- Software requirements
- Attestation

## Instructor

- Balancing: education and product
- Progress monitoring, advising and controlling
- Grading



### Групповой проект по технологии производства программного обеспечения

#### Назначение документа:

Процедура сдачи зачета.

#### Разработан:

Д. Ж. Корзун, доцент каф. ИМО, к.ф.-м.н.  
под редакцией зав. кафедрой ИМО, доцента, к.т.н. Ю. А. Богоявленского

#### Занятия:

2005/06 учебный год (весенний семестр, лабораторные).

#### 1 Общие критерии получения зачета

А) команда студентов-разработчиков должна показать, что она удовлетворяла следующим критериям командной работы.

1. Полноценный набор разработанной документации (оценивается еженедельно инструктором в журнале выполнения проекта, предоставляется куратору за 1 неделю до зачета).
2. Полноценный код разработанного программного продукта (оценивается еженедельно инструктором в журнале выполнения проекта, предоставляется куратору за 1 неделю до зачета).
3. Регулярность работ по проекту в течение всего периода разработки (оценивается еженедельно инструктором в журнале выполнения проекта).
4. Удовлетворительное внешнее взаимодействие команды в ходе всего проекта (оценивается еженедельно инструктором в журнале выполнения проекта).
5. Удовлетворительное внутреннее взаимодействие команды в ходе всего проекта (оценивается еженедельно инструктором в журнале выполнения проекта).
6. Удовлетворительные процедуры обеспечения качества в ходе всего проекта (оценивается еженедельно инструктором в журнале выполнения проекта).



# Nokia—PetrSU Collaboration

The idea appeared in 2007–2008 (Sergey Balandin, Anatoly Voronin, Anton Shabaev)

## Expert areas for PetrSU

- Maemo programming
- Symbian programming



## Goals

- Modern technologies to Russian education, research and industry
- Regular training of students (Faculty and CS Dept.)
- A team of qualified developers and experts (PetrSU IT park)
- Center of Mobile and Wireless Technologies (as a department of the PetrSU IT park)





# Russian Maemo Community

<http://maemo.cs.karelia.ru>

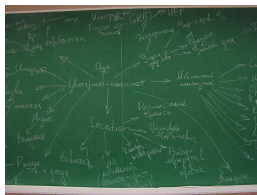
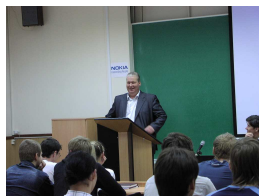
- The All-Russian forum for Maemo developers
- Ideas, experience and software from everyone
- Study materials
- SE Project support

## Training

- Summer School, Aug.2008
- Winter School, Feb.2009
- Maemo Training at FRUCT, Apr.2009

**SE projects:** Aug. 2008 – Feb. 2009

- In total: 23 initial student projects
- To the Maemo Garage: 3 projects





# Features (compared with regular student SE projects)

## Phases

- This semester: producing a demo prototype
- Summer 2009: Experimenting
- Autumn 2009: Publishing the code in the Maemo garage

## Organization

- Instructor integrates some manager functions
- Mixed teams: 1st – 6th year students
- 16–18 (wo)man-hours per week (8–10 for regular projects)
- Personal study plans for 3rd year students
- Regular all-project seminars (Saturdays)



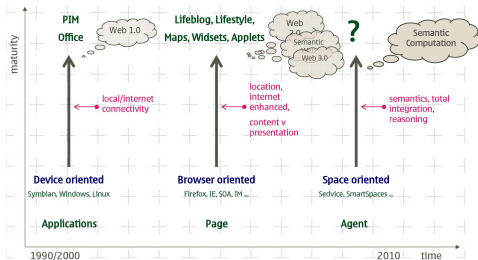
# Modifications to the Curriculum

Semester	Course
First year	
1	Introduction to C programming Introduction to Shell
2	C++ and Data Structures IA-32 Architecture with GAS Assembler Elements User Interface Design with GTK/Qt
Second year	
3	Computer Networks UNIX Programming Introduction to Java Programming
4	Operating Systems Basics of Internet Tablet Programming
Third year	
5	Software Engineering Basics of Symbian Programming



# Future ...

- Maemo technology to the educational courses
- SE projects for the Maemo platform
- Smart spaces



from Ian Oliver's presentation *Towards the Dynamic Semantic Web*

