

Hackathon based learning – new approach in study of Informatics

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Abstract— This paper presents the new approach in study of Informatics – HBL. HBL is acronym for Hackathon based learning. Hackathons are events when more teams are working on their projects, which have similar or different topics, in the same time. These events last 12, 24 or 48 hours. During that period teams get help and support from programmers from IT companies. After Hackathon, teams are presenting their ideas and project to the judges.

I. INTRODUCTION

The word Hackathon is derived from the normal word Marathon where people run long distances or participate in some long activity just until they finish it [1]. It is similar activity where participants *hack* (programming, coding) and don't run. A Hackathon is a 12-24-48 hour marathon of developing, creating, programming, and delivering a solution in a relatively short period of time. Many of them are competitions but some are more educational and they are organized by companies or educational institutions.

Hackathon can be divided in three groups:

- Software
- Hardware
- Mixed (software/hardware)

In software Hackathons aim is to make software solution for given topic. In some cases tools and programming languages are strictly defined, but mainly competitors have freedom for choosing it.

Hardware Hackathons have aim to make some hardware or to use chosen hardware to make project.

Mixes Hackathons have aim to make some hardware or to use given hardware and to make software for integrated system or hardware.

Main characteristics of Hackathons:

- Problem or topic is given before Hackathon
- Problem or topic is given at the beginning of Hackathon
- Project based learning - competition
- Team work
- Stress situations
- Collaboration
- New knowledge
- Help of mentors and other teams
- Improving presentation skills
- No sleep, just work.

In Subotica Tech, emphasis is on practical study. We try to give more chances to students to work in team, in stress situations, finishing their projects in deadlines. At the Department of Informatics we organized three Hackathons, one that was competition organized by local ICT company and two other that was organized for the needs of three subjects.

II. HACKATHONS

Our students participated in several Hackathons and various competitions.

A. Microsoft Imagine Cup 2015

Imagine Cup is a global student technology program and competition that provides opportunities for students across all disciplines to team up and use their creativity, passion and knowledge of technology to create applications, games and integrates solutions that can change the way we live, work and play [2].

Hackathon was organized in Game Development category as a National semifinals event. Programming languages and technologies were not been strictly defined. Seven teams were qualified to the competition. Their task was to make playable game, one or more levels, in desired technology. During Hackathon competitors got professional help from the mentors from leading Serbian game developing studios. Hackathon lasted 24 hours.

After 24 hours teams were presenting their solutions. Three teams from our College were participated in this event. Students were very satisfied with Hackathon.



Figure 1. Screenshot of first game project



Figure 2. Screenshot of second game project

B. Safety Code Hackathon 2016

Second Hackathon where our students took part was SCH or *Safety Code Hackathon*. The aim of the competition was to create an app that would provide assistance to security of young in Serbia (emergency, environmental safety, traffic safety, safety on the Internet, violence and health). It was organized in Belgrade in two phases: National semifinals and National finals.

Programming languages and technologies were not been strictly defined. Team of our College won third place in both phases with their project: multiplatform web application which contains anonymous chat for getting adequate help from professional medical persons.

Seven teams were qualified for competition.



Figure 3. Students are presenting their project

C. BizKod

One of the biggest ITC company in internet business, Infostud, had organized Hackathon for our students. Name of this project was *BizKod*. It was a largest competition that was organized for our students by some company.

Topic-task was given two days before competition. It was a real estate topic. Programming languages and technologies were not been strictly defined. 8 teams and 40 students were participated. Students were form second and third year of Informatics and Technical Management.

Competition had three phases:

- I. Test task/Market research
- II. Programing during 12 hours at our College
- III. Presentation of realized projects

In first phase students had to make a team, to give team a name, to solve a test task and to made market research about existing web sites and mobile applications that deals with real estate in Serbia.

Students were inspiring about team names: *High5*, *Syntax Error*, *Code Miners*, *Hyperion*, *Mago Fibrane*, *GirlsfromVTS*, *Crash Test Dummies* and *The Walking Programmers*.

Second phase was programming at our College throw 12 hours. During this phase teams got help from mentors-programmers from Infostud company.

In the third phase teams were presenting realized projects to the judges-professors and employees from Infostud. Presentation of projects was organized next day after 12 hours of programming.



Figure 4. Students are programming at College



Figure 5. Students are programming at College

III. HBL – HACKATHON BASED LEARNING

Based on results and feedbacks of students that were involved in such a competition, we try to involve more students to take part in Hackathons.

Almost in every subject in study of Informatics, students have obligation to make practical project-software. Because of that we wanted to change a way of preparing projects and the HBL acronym was defined. This acronym means *Hackathon Based Learning*.

Hackathons are good chance to try to work on project in team in short period of time, to get more practical knowledge and to prepare students for situations of real

life when a delivering software-product in deadline are very important and crucial thing in ICT sector.

A. First Hackathon

First Hackathon was organized for the students of second year of Informatics that attended two courses: *Web programming* and *Databases 2*. It was a good opportunity to connect these courses because obligation for *Web programming* course is to make web project that has database and in course of *Database 2*, students have to design and realize database. Hackathon had three phases.

Task for this Hackathon was to make integrated project - database design and web based software/application. Topic of database was given and based on that students had to describe in detail idea of future web project. After receiving their ideas, professors reviewed them and if it was necessary they gave students some proposals for improvement. Also students had a task to make a team and to give a name to a team. In this phase teams had time of one week to work on project at home. If they had some questions they could write an email to professors. This phase was interested for all teams because they were helping each other.

In second phase teams came to College to work in 12 hours Hackathon. During that period teams got help from professors, other teams and from programmers of local ICT companies. These programmers were mainly former students of our college. There were 8 teams with 16 students. Teams were: *Be me*, *Bombe*, *CtrlC*, *Informatix*, *Insane Code*, *noComment*, *Pvm* and *Qwerty*. Programming languages and techniques were defined: PHP, MySQL, CSS, HTML, JavaScript, Ajax, JSON, XML, Bootstrap, but students had a freedom to use other libraries or technologies that can help them to make a better project.

Third phase was organized 5 days after Hackathon. During these 5 days teams had a chance to finish their projects. In third phase students were presenting their solutions to other teams and professors.

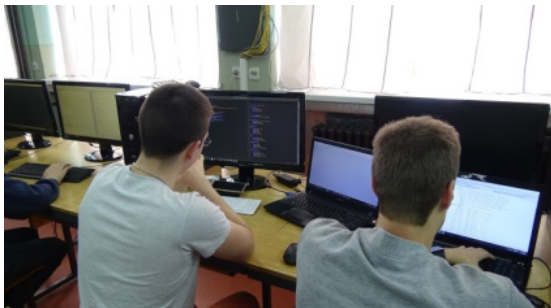


Figure 6. Students during the first Hackathon

The results of this Hackathon were

- 8 finished web based projects
- Satisfied students and professors
- Students got new experience and knowledge in programming
- Students improved team work and presentational skills
- Friendship building
- Students passed the exam

Some of student's feedbacks are:

"It was my first hackathon. I didn't know what to expect, so far I have only seen them in movies and I couldn't wait to experience it for myself. From the moment I stepped in the room and the event started I could feel the auras of excitement coming from the students and the professors."

"Everyone was geeking and nerding out for the slightest coding challenge, all while helping each other fixes various issues. It was amazing!!!"

After this event and feedbacks we were encouraged to implement the next Hackathon.

B. Second Hackathon

Second Hackathon was organized in course *Internet technologies* for the students at second year of Informatics and Technical management. Students had a task to make web based project with database design. Also they needed to make a secure administration page for content management. Topic of project was not defined and students had a freedom to decide about that.

Mandatory programming languages and techniques were: PHP, MySQL, HTML and CSS, but every team used some additional technology. There were 13 teams with 26 students. Teams were: *A&A*, *A byte of π* , *BINGBOT*, *CAD team*, *Cyb€r W@rrior\$*, *DROP TABLE*, *Dual Core*, *Kratos*, *SUPER GIRLS*, *The Šinters*, *2 tangos please*, *Zoltbert team* and `);UPDATE Studenti SET ocena=6 WHERE ocena<6;`

This Hackathon also consisted of three phases.

In first phase teams described their ideas and send them to professors. Professors helped them in improvement of ideas. During this phase teams were working at home on project.

Second phase was held at College and lasted 12 hours. Programmers from local ICT companies gave professional support to teams.

One week after second phase third phase were organized. Teams were presenting their solutions in the front of other teams, professors and programmers.

Student made 13 usable web projects and the topics were different:

- Vinyl web shop
- Forum
- Gamers social network
- Sport web shop
- Portal for helping the animals #1
- Portal for helping the animals #2
- Web page of student's parliament
- Tourism page for villages of Serbia
- Job find web page
- Electrical journal
- Travel agency
- Web shop for 3D models
- Web page for finding transport



Figure 7. Students during the second Hackathon

The results of this Hackathon were

- 13 finished web based projects
- Satisfied students, programmers and professors
- Students got new experience and knowledge in programming
- Students improved team work and presentational skills
- Friendship building
- Students passed the exam

Students were very satisfied with this event. For every team it was their first Hackathon. Some of the feedbacks are:

“The environment is very healthy for work, as an independent and collective; Help of guests (programmers) a very nice addition, and we can learn lot of from them.”

“In my opinion, very useful to organize such a competitions, from my own experience I tell you that you

are more motivated and concentrated to finish the project successfully. I learned lot of from other teams, professors and programmers. In the future I would like to participate in another Hackathon.”

IV. CONCLUSION

HBL is acronym for Hackathon based learning. Hackathons are events when more teams are working on their projects, which have similar or different topics, in the same time.

During that period teams get help and support from programmers from IT companies.

Hackathons are great opportunity to learn new technologies, team work, to improve presentations skills and to deliver software in time. They also prepare students for real life situations.

At Subotica Tech three Hackathons were organized: one by local ICT company and two for the needs of three courses.

Students are very satisfied with implementation of Hackathons in learning process at the study of Informatics.

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