Bachelor Semester Project - Web application for Computer Science Market Analysis

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Abstract

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1. Introduction (± 5% of total words)

Computer Science is one of the most important domains in the world and become indispensable in everyday life. As we live in a digital age, there are a lot of industries and companies which focus on improving and exploring new capabilities in this domain. Thus, this led to the grow of complexity and creation of the new sub-fields which request new skills from employees and new places in the companies and industries.

So, a lot of new students who started to study the field of Computer Science may ask themselves, what are the possible fields of Computer Science and what are the possibilities in terms of career perspectives and the availability of jobs per field.For answering theses questions, a software was been developed for performing the actual computer science market analysis. It consists to fetch all available jobs from different countries and companies which belong to the Computer Science domain. Then, based on theses founded jobs, a lot of different statistics can be created such as tables and plots which can be used for observing the trends of the domain. Therefore, by using and observing theses statistics, students will have the possibility to choose the right field and seeing the perspectives for future career.

The Bachelor Semester Project will focus on deploying this recent developed software, called Jobs Observer, on a cloud server in order to make his futures available to all students, who would like to observe the actual Computer Science possibilities. During this project, a small but essential part of the software will be deployed and will be considerate as the basis for future upgrades. Moreover, this part must be operational and include some of possible statistics of the existing software. Then, statistics delivered by the software will be discovered for understanding at best the results for correct implementation. As the software deployment and development are in the context of software engineering, a small research in the field of software testing will be perform. This research will

consist to prove the correctness of a program by looking from the scientific point of view.

2. Project description (± 10% of total words)

2.1. Domains

The Bachelor Semester Project is done in different domains of computer science such as Software Engineering, Web development and Software testing.

2.1.1. Scientific Domain
. The Software testing is a process which consists to verify and validate that a software is a bug free. The purpose of software testing is to find errors and bugs in the functionalities of a software that can lead from smaller failures to the malfunction of the overall system. Software testing is divided in verification and validation. Verification[1] process allows to understand, if the development of the software is right. It consists to verify the specified requirements in order to understand if the development of the software is conformed to these requirements. Validation[1] is a process which consists to understand, if the developed software is the right software. This process happened after the development of a software and allow to answer, if the developed software meets the requirements and the needs of the customers.

2.1.2. Technical domains. **Software Engineering** is based on the principles, which are used in the field of engineering. In Software Engineering, developers develop different types of software which can be small, large, complex or easiest. During the development, they deal with the requirements specification, software design, testing and maintenance. Moreover, developers must apply a structured and disciplined approach for being able to navigate codes, during the development and maintenance. In Software Engineering, developers must base on the customer's requirements, for providing a software that meets their needs. In addition, some other different factors have to be considerate as budget, time constraint or efficiency.

Web development consists to create web applications that are developed, deployed and accessed on the Internet. Web

development is divided in front-end and back-end development. Front-end development consists to design the graphical interface of a web application that will allow the interaction between the system and the end users. Usually, the front-end is composed of several elements that are designed by CSS, HTML or JavaScript. Back-end development is hidden part of a web application. Back-end is composed of three parts such as functionalities of software, databases and server which allows to access and perform operations on the system.

2.2. Targeted Deliverables

2.2.1. Scientific deliverables. During this project, there will be only two scientific deliverables produced. First deliverable will be in the field of software testing and will based on white-box principle. White-box is a software testing method where the implementation, design and structure are known by the tester. So, the scientific deliverable will consist to prove the correctness of functionalities of the software. Firstly, a proof for the correctness of one functionality has to be established. Secondly, based on the first proof, the correctness for all functionalities have to be written in order to show the correctness of the entire software. Second deliverable consists to define requirements for different functionalities of statistics which will be used for understanding if the performed functionality return a correct result and reach the objective of the imposed requirements.

2.2.2. Technical deliverables. After the project, two types of technical deliverables will be produced, front-end and back-end deliverables. Front-end deliverable is divided into two parts. First part is to create a mockup of the user interface that will be used for the interaction. This user interface must be easy to understand, have a structure and the basic elements of a webpage. Second front-end deliverable will consist to design the produced mockup by using HTML and CSS which will allow to implement completely the front-end and make it operational. Back-end deliverable consists to deploy an existing software to an AWS server. Firstly, for making the software compatible with the server, a new Django project has to be created. Then, the functionalities of existing software have to be transfer to the new software and some changes must be performed in order to make the functionalities operational on a server. Secondly, the database from the existing software has to be reused in order to fetch all founded jobs. Third, the second deliverable form front-end has to be reused for connecting the user interface to the functionalities in the back-end. Finally, the created Django software will be deployed on an AWS Server.

3. Pre-requisites ([5%..10%] of total words)

Describe in these sections the main scientific and technical knowledge that is required to be known by you before starting the project. Do not describe in details this knowledge but only abstractly. All the content of this section shall not used, even partly, in the deliverable sections.

3.1. Scientific pre-requisites

3.2. Technical pre-requisites

4. A Scientific Deliverable 1

For each scientific deliverable targeted in section 22 provide a full section with all the subsections described below.

4.1. Requirements ($\pm$ 15% of section's words)

Describe here all the properties that characterize the deliverables you produced. It should describe, for each main deliverable, what are the expected functional and non functional properties of the deliverables, who are the actors exploiting the deliverables. It is expected that you have at least one scientific deliverable (e.g. "Scientific presentation of the Python programming language", "State of the art on quality models for human computer interaction", ...) and one technical deliverable (e.g. "BSProSoft - A python/django website for IT job offers retrieval and analysis", . . .).

4.2. Design ($\pm$ 30% of section's words)

Provide the necessary and most useful explanations on how those deliverables have been produced.

4.3. Production ($\pm$ 40% of section's words)

Provide descriptions of the deliverables concrete production. It must present part of the deliverable (e.g. source code extracts, scientific work extracts, . . .) to illustrate and explain its actual production.

4.4. Assessment ($\pm$ 15% of section's words)

Provide any objective elements to assess that your deliverables do or do not satisfy the requirements described above.

5. A Technical Deliverable 1

For each technical deliverable targeted in section 22 provide a full section with all the subsections described below. The cumulative volume of all deliverable sections represents 75% of the paper's volume in words. Volumes below are indicated relative the the section.

5.1. Requirements ($\pm$ 15% of section's words)

cf. section 5 applied to the technical deliverable

5.2. Design ($\pm$ 30% of section's words)

cf. section 5 applied to the technical deliverable

5.3. Production (± 40% of section's words)

cf. section 5 applied to the technical deliverable

5.4. Assessment (± 15% of section's words)

cf. section 5 applied to the technical deliverable

Acknowledgment

The authors would like to thank the BiCS management and education team for the amazing work done.

6. Conclusion

The conclusion goes here.

References

[1] Verification vs Validation." Software Testing Fundamentals, 3 Mar. 2018. http://softwaretestingfundamentals.com/verification-vs-validation/

7. Appendix

All images and additional material go there.