

**COSC 565/ COSC 465: Software Engineering I**  
**Assignment 1**  
**Due: 24<sup>th</sup> September, 2019**

- 1) Discuss whether professional engineers should be certified in the same way as doctors or lawyers. Give advantages and disadvantages of certification in Software Engineering. Can a software engineer become a certified Professional Engineering (PE)? Explain. [10]
- 2) Define the depth versus the breadth issue in software complexity. [10]
- 3) Giving reasons for your answer based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following systems: [20]
- A system to control anti-lock braking in a car
  - A virtual reality system to support software maintenance
  - A university accounting system that replaces an existing system
  - An interactive travel planning system that helps users plan journeys with the lowest environmental impact
- 4) Using your knowledge of how an ATM is used, develop a set of use cases that could serve as a basis for understanding the requirements for an ATM system. [Write atleast 5 **Textual Use Cases**] [20]
- 5) Select one of the three research topics in software engineering (SE): [40]
1. Model-driven development (or model-driven engineering, or model-driven architecture)
  2. Software tools and environments (you can particularize the tools for specific activities, e.g., data visualization, software design, automated code generation, automated testing).
  3. Software engineering for specific domains (e.g., cloud, big data, IoT (Internet of Things), CPS (Cyber-Physical Systems), Software quality, security)

Research the topic and provide the following:

**A. Overview of the topic**

[15 points]

Describe what is the topic about, what are its distinguishing characteristics, and why the topic is important from a software engineering point of view. Briefly describe two examples of application (e.g., existing or potential projects) and indicate the main challenges currently addressed by SE researchers working on this topic. Specifically, identify at least 3 research questions or research directions for the topic (you can cite other references than the paper in Section B below) [recommended 250 – 500 words].

**B. Representative paper or technical report**

[15 points]

Find a major/seminal paper or technical report about your selected topic and summarize its main ideas and contributions (300 to 500 words). Indicate your own views on the paper or report. Important, the paper or the technical report should provide a roadmap, overview, survey, or key knowledge about the topic.

**C. Resources**

[10 points]

Provide information about relevant resources pertaining to the topic. Specifically, provide at least 7 items (each with a brief description of 50 to 100 words), at least one for each of the following categories:

1. Relevant websites
2. Relevant research labs and/or organizations
3. Important books on the topic
4. Other significant paper(s) (than the one you used in Section B above)
5. Major project(s) [with links]
6. Major tool(s) [with links]
7. Other (e.g., related online courses, PhD theses, sets of slides, videos, etc.)