

SEPQM Assignment 2 (Group Based Assessment)

Introduction of a new complexity metric

Despite the advantages, Cyclomatic Complexity (CC), Weighted Composite Complexity (WCC), and Cognitive Functional Size (CFS) metrics have their limitations. **Write a report proposing a new complexity metric to overcome the limitations of the above three metrics.** When proposing the new metric, you are required to consider about the **practicality of implementing a complexity measuring tool** based on that metric. i.e., one should be able to easily develop a complexity measuring tool based on the proposed metric.

The report should consist of the following:

- A **minimum** of **two advantages** and **two limitations** of the above mentioned three metrics.
- An explanation of how the limitations mentioned to the previous point can be overcome.
- A brief explanation of the new metric.
- The factors considered by the new metric. A group member should propose a **minimum** of **two factors** to the new metric. **Additional marks** would be awarded for students who propose more than two factors.
- How the new metric captures the complexity introduced by each of its factors.
- The complexity calculation formula/equation of the new metric along with the meanings of the characters/symbols used in that.
- Rationale behind the complexity calculation formula/equation of the new metric. i.e., explain why you decided to add, subtract, divide, or multiply the complexity due some of the factors or consider the exponential or log values of the complexity factors etc.
- Calculation of complexity of **two different executable java programs** using the newly proposed metric. You are free to decide on the number of LOCs of each program. An explanation of how complexity of each program was calculated should also be included. In addition, make sure that **each program covers all the complexity factors** considered by the new metric. **No marks would be awarded for just calculating the answers, without any explanation.**

The report would be checked for **plagiarism**. The similarity of the paper should be **less than 20%**. Hence, it should be written in your own words. **It must not include material directly copied from elsewhere** except where it is obviously presented as a 'quote'. The ideas, information, data, diagrams, or tables taken from different sources must be acknowledged.

Note: Make sure to **list** the references under the **reference section** and to **cite** the references in the **body area** of the report. Number the reference items consecutively in square brackets (e.g. [1]). Multiple references are each numbered with separate brackets (e.g. [2], [3], [4]–[6]). Examples of reference items for different categories are given below.

▪ **Example of a book:**

- [1]. S. M. Metev and V. P. Veiko, Laser Assisted Microtechnology, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.

▪ **Example of a book in a series:**

- [2]. J. Breckling, Ed., The Analysis of Directional Time Series: Applications to Wind Speed and Direction, ser. Lecture Notes in Statistics. Berlin, Germany: Springer, 1989, vol. 61.

Example of a journal article:

- [3]. S. Zhang, C. Zhu, J. K. O. Sin, and P. K. T. Mok, "A novel ultrathin elevated channel low-temperature poly-Si TFT," IEEE Electron Device Lett., 20 (8), pp. 569–571, Nov. 1999.

Example of a conference paper:

- [4]. M. Wegmuller, J. P. von der Weid, P. Oberson, and N. Gisin, "High resolution fiber distributed measurements with coherent OFDR," in Proc. ECOC'18, Germany, June 2018, pp. 109.

Example of a patent:

- [5]. R. E. Sorace, V. S. Reinhardt, and S. A. Vaughn, "High-speed digital-to-RF converter," U.S. Patent 5 668 842, Sept. 16, 1997.

▪ **Example of a website:**

- [6]. (2002) The IEEE website. [Online]. Available: <http://www.ieee.org.htm>

▪ **Example of a web page:**

- [7]. M. Shell. (2002) IEEEtran homepage on CTAN. [Online]. Available: <http://www.ctan.org/tex-archive/macros/latex/contrib/supported/IEEEtran.htm> [Accessed: 6 July 2013]

▪ **Example of a databook as a manual:**

- [8]. FLEXChip Signal Processor (MC68175/D), Motorola, 1996.

▪ **Example of a datasheet:**

- [9]. "PDCA12-70 data sheet," Opto Speed SA, Mezzovico, Switzerland.

▪ **Example of a master's thesis:**

- [10]. Karnik, "Performance of TCP congestion control with rate feedback: TCP/ABR and rate adaptive TCP/IP," M. Eng. thesis, Indian Institute of Science, Bangalore, India, Jan. 1999.

▪ **Example of a technical report:**

[11]. J. Padhye, V. Firoiu, and D. Towsley, “A stochastic model of TCP Reno congestion avoidance and control,” Univ. of Massachusetts, Amherst, MA, CMPSCI Tech. Rep. 99-02, 1999.

▪ **Example of a standard:**

[12]. Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification, IEEE Std. 802.11, 1997.

Other Details

| | |
|-----------------------------|---|
| Weighting | The assignment is worth 20% of the overall marks for the unit |
| Deliverables | A soft copy of the “ <i>SEPQM_Assignment Two_Template</i> ” (in the form of a word document). Rename the template as SEPQM_Assignment Two_<Group ID>.docx . E.g.: SEPQM_Assignment Two_REG_WE_01.docx. |
| Due Date | 1 st June 2021 8.30a.m. |
| Contribution | All the group members are expected to make an equal contribution to the report. |
| Method of submission | One of the group members should upload the completed “ <i>SEPQM_Assignment Two_Template</i> ” to the “ <i>Answer to assignment 2</i> ” link given on CourseWeb module page. Note: Late submissions would not be allowed , and zero marks would be awarded for such groups. |