



**SOARING
UPWARDS**
MALAYSIAN HIGHER EDUCATION



UNIVERSITI
TEKNOLOGI
MARA

KONAKA

KONFERENSI AKADEMIK

2016

Pengkongsian Ilmu Dari Perspektif Islam

30 November 2016 | Rabu
UiTM Cawangan Pahang
Kampus Jengka



The Characteristic of GPA and CGPA Forecast Calculator (GCFC)

Nor Zalina Ismail^{1*}, Muhd. Eizan Shafiq Abd. Aziz², Mohd. Rizal Razak³,
Nazirah Ramli⁴, Mohd. Norafizal Abd. Aziz⁵

^{1,2,3,5}Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Cawangan (Pahang)
Kampus Raub, 27600 Raub, Pahang, Malaysia
nza1601@pahang.uitm.edu.my, eizan@pahang.uitm.edu.my, dragon_admire007@pahang.uitm.edu.my,
mnorafizal@pahang.uitm.edu.my

⁴Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Pahang,
Kampus Jengka, 26400 Bandar Tun Razak Jengka, Pahang, Malaysia
nazirahr@pahang.uitm.edu.my

*Corresponding Author

Abstract: Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA) are important mechanisms to assess students' academic performance by many higher academic institutions and some boarding schools in Malaysia. However, the manual calculation process of GPA and CGPA is tedious, time-consuming and sometimes prone to human error. Thus, GPA and CGPA Forecast Calculator (GCFC) is developed to overcome the problem occurred in manual GPA and CGPA calculation and forecasting process. It is developed based on Web Engineering Process Model that is suitable for web application development. GCFC is a convenient web application tool that can ease and speed up the GPA and CGPA calculating and forecasting process. GCFC can be accessed at anywhere and anytime through the internet by using web browsers such as Mozilla Firefox, Goggle Chrome, Internet Explorer and others. GCFC facilitates a user with the "save" button that will save the calculated forecasting GPA and CGPA details into portable document file (PDF) format. Also, GCFC enabled users to print the PDF file for future used. Other special features of GCFC, it gives a freedom to users on deciding the number of subject to be input in the application. This flexibility is useful for future works as it can be expanded to other higher academic institution and boarding schools.

Keywords: Calculator, Cumulative Grade Point Average, Grade Point Average, Web Application

1. Introduction

Nowadays, a web application is a necessity tool in the rapid development of the information technology (IT) world. It gives much benefit to many areas such as industry, government, education and also in personal human life. A web application or also known as Web apps is any program that accessed over the internet through the web browsers such as Mozilla Firefox, Internet Explorer or Netscape Navigator (Technopedia Inc., 2016). Example of web application available online for public used is calculator.com.my (2016). It has variety of functions such as online calculator, house loan calculator, credit card repayment calculator, personal loan calculator, car loan calculator, fixed deposit/saving calculator, currency converter, clothes/shoes chart, BMI calculator and unit converter.

Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA) are important mechanisms to assess students' academic performance by many higher academic institutions and some boarding schools in Malaysia. The definition GPA is the average grade earned by student calculated by dividing the grade points with the total number of credits hour for certain semester (Farlex Inc, 2016). As cumulative means "increasing the addition after another" (Cambridge University Press, 2016) thus, CGPA is defined by dividing the grade points from all semesters by total credit hours from all semesters (WD Communications LLC, 2016a). However, the manual calculation process of GPA and CGPA is tedious, time-consuming and sometimes prone to human error.

Thus, GPA and CGPA Forecasts Calculator (GCFC) is developed as an advantage of

web-based application technology to help various parties make a forecast on GPA and CGPA easily, in a short time and also can be accessed anywhere and everywhere as long as there is an internet connection and web browser available. This application is based on Universiti Teknologi MARA (UiTM) grading system. As GPA and CGPA are advantageous mechanisms to exhibit student's academic performance, thus GCFC will give benefits to three categories of users who are the students, lecturers (Academic Advisors) and administrators. GCFC can overcome the problems occurred in the manual GPA and CGPA calculation processes by helping people that have problems in dealing with numbers and mathematics formula. Thus, GCFC just need an input for certain information and the rest of calculation process is done by the application. Besides that, GCFC produces speedy result of GPA and CGPA which can reduce the lengthy time taken for calculating the results of the manual calculation.

2. Literature Study

The main function of GCFC is to facilitate the calculation and forecasting process of GPA and CGPA based on Universiti Teknologi MARA (UiTM) grading system. There are four websites that provide the GPA or CGPA calculator and also forecast function that can be found on the internet. Lai (2016) creates the web application for calculating the GPA and CGPA for Universiti Tun Abdul Razak (UTAR) which is based on UTAR grading system. WD Communications LLC (2016b) only provides the automated GPA calculator but not for CGPA calculation. Furthermore, the web application provides by HIOX Softwares Pvt Ltd.(2016) and Anonymous(2016) can only forecast the CGPA but cannot forecast the GPA per semester. Besides that, HIOX Softwares Pvt Ltd. (2016) used the percentage grading system that is not suitable for Malaysia universities grading system.

The differences between above-mentioned web applications and GCFC are the GCFC have an additional features such as users can give input on their personal details such as name, matric number and program. Other feature is GCFC provides the facilities to save the document in portable document format (PDF) for future references and printing. In contrast, the web application created by Lai (2016), HIOX Softwares Pvt Ltd.(2016) and Anonymous (2016) do not have the features for input personal details, saving and printing the documents for future used. Although the CGPA calculator created by Anonymous (2016) has the print button but it cannot work, and this web application also does not have features for input personal details and save the document for future used.

3. Methodology

The Web Engineering Process Model inspired by Manju et al. (2015) has been used for the development of this GCFC web application. This model is chosen as it is tailored for web application development. Other software engineering model is suitable for software development but may be not suitable for web application development. The development of this web application consists of five main processes which are planning, modelling, construction, deployment and communication (as shown in Fig. 1).

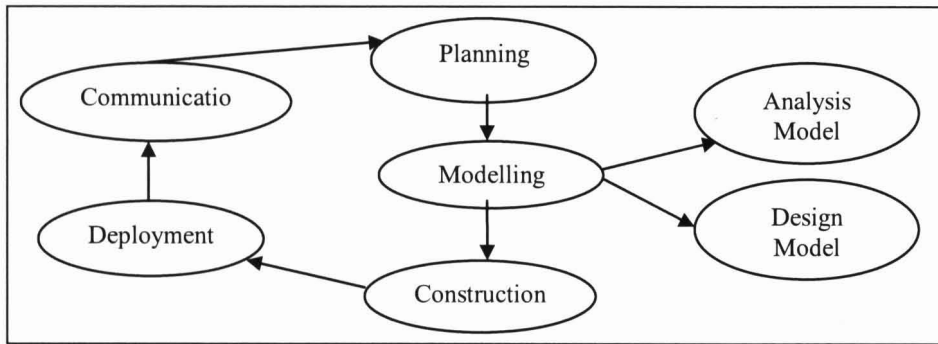


Fig 1. Web Engineering Process Model

The development starts with the Planning process that will identify the person in charge, the risk that will be occur and the estimation due date. This is followed by the Modelling process which has two parts namely as the Analysis Model and Design Model. The Analysis Model will perform an analysis on users (student, administrator, academic advisor) requirement. Then, based on users’ requirement input in the Analysis Model, the web application algorithm will be sketched and designed. The third process is the Construction of the web application by performing the coding and testing process. In this process, the software used is the Adobe Dreamweaver and the language used is the hypertext markup language (HTML), jQuery and Hypertext Preprocessor (PHP). Next, the Deployment process will be carried out by uploading the application into Universiti Teknologi MARA (UiTM) Pahang server and the configuration is done to obtain the URL for GCFC. Finally, the Communication process taken place by involving real users such as students, administrator and PA to get feedback on this application. The process will start again by employing the Planning process if any amendment needs to be done based on the feedback in the Communication stage.

4. GCFC Characteristic

GCFC can be reach through a web browsers such as Netscape Navigator, Mozilla Firefox, Google Chrome or others by using Uniform Resource Locator(URL): www2.pahang.uitm.edu.my/forecast. The special characteristics of GCFC are:

4.1 Input on Personal Academic Details

GCFC allows the user to give input on their personal academic details such as student’s number, name, program, previous credit and grade point total. Fig. 2 shows the interface for input on academic information detail for future references.

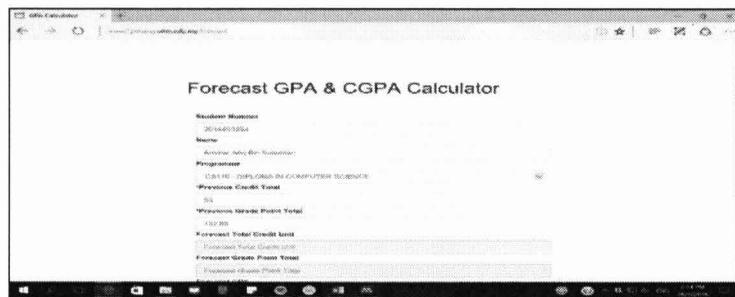


Fig. 2 Input Area for Personal Details and Previous Credit Total and Grade Point Total

4.2 Input Area for Subject to be Taken is Flexible

It is interesting when the user can freely give input on the subject to be taken for the next semester based on individual preferences. At least one subject need to be taken and there is no limit of the subjects to be taken. Fig. 3 shows the input area of subject the will be taken for the next semester together with the expected grade. The user can simply add other subjects by clicking “+Duplicate” button. Then, GCFC will display the forecast total credit unit, forecast total grade point, forecast GPA and forecast CGPA. This output will be displayed immediately after each subject will be take for next semester is enter as input. This characteristic can give benefit for future works such as to expand the usage of GCFC to boarding schools like Maktab Rendah Sains Mara (MRSM) as they have many subject to be taken per year.

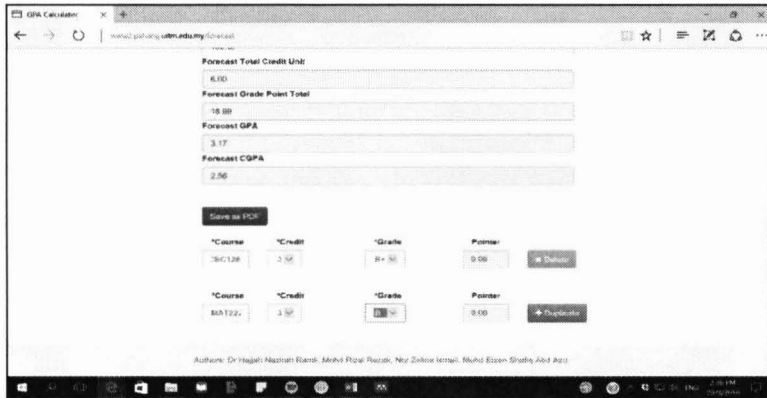


Fig. 3 Input Area for Subject to be taken with Expected Grade

4.3 Can Be Saved and Print for Future Used

GCFC is not only able to display the output but can also save the output as PDF file and can be printed for future used. If the user chooses to click “Save as PDF” button, the PDF file will be generate as shown in Fig. 3. This PDF file can be saved into the secondary storage or printed as a hardcopy.

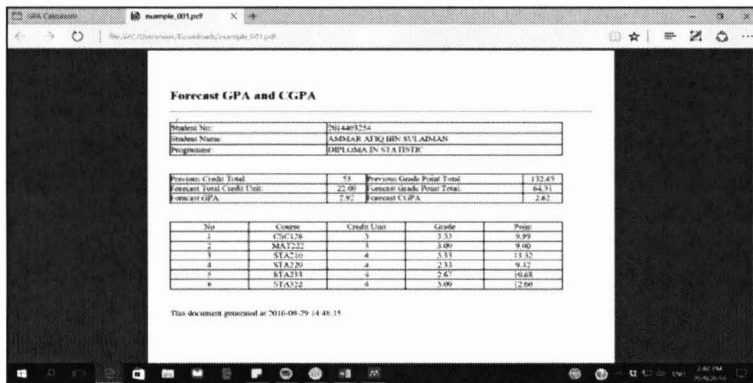


Fig. 4 Sample of PDF File

The similarity and differences of the GCFC and other GPA and CGPA Calculator are summarized in Table 1.

Table 1. The Similarity and Differences between GCFC and other GPA or CGPA Calculator Available on The Internet

Characteristic	Lai KC (2016)	HIOX Softwares Pvt Ltd., (2016)	WD Communications LLC (2016b)	Anonymous (2016)	GCFC
Can Forecast GPA	✓	✗	✓	✗	✓
Can Forecast CGPA	✓	✓	✗	✓	✓
Can Input Academic Personal Details (Name, Student Number, Program)	✗	✗	✗	✗	✓
Can Save The Forecast GPA or CGPA Details in PDF file	✗	✗	✗	✗	✓
Can Print PDF file	✗	✗	✗	✗	✓

5. Conclusion

GCFC is a web-based application that facilitates users in GPA and CGPA calculating and forecasting process. It is a user-friendly and flexible for any type of users. GCFC has features for adding unlimited number of subject to be taken in the next semester. Other useful characteristic is the document can be saved and printed for future used together with the personal information (student's name, student number and program). GCFC can help to boost students' motivation and thus can help them to be graduated on time. This web application can be extended to other higher academic institution and schools that used GPA and CGPA as tools for measuring their student academic performance.

6. References

- Anonymous. (2016). GPA forecast. Retrieved November 1, 2016, from <http://academic.cuesta.edu/pim/tools/GPAForecast.htm>.
- Calculator.com.my. (2016). BMI Calculator. Retrieved October 27, 2016, from <http://www.calculator.com.my/bmi-calculator#.WBGsgoVOI2w>.
- Cambridge University Press. (2016). Cambridge Dictionary. Retrieved October 31, 2016 from <http://dictionary.cambridge.org/dictionary/english/cumulative>.
- Farlex Inc. (2016). The Free Dictionary by Farlex. Retrieved October 27, 2016, from <http://www.thefreedictionary.com/grade+point+average>.
- HIOX Softwares Pvt Ltd. (2016). EasyCalculation.com. Retrieved November 1, 2016, from <https://www.easycalculation.com/statistics/cgpa-calculator.php>.
- Lai, K. C. (2016). No Title. Retrieved November 1, 2016, from <http://www.utar.edu.my/fegt/file/calc.htm>.
- Mathai, M. K., Venugopal, R., & Abraham, J. T. (2015). Software Engineering Process in Web Application Development. *IOSR Journal of Computer Engineering*, 17(1), 28–32. <http://doi.org/10.9790/0661-17152832>.
- Technopedia Inc. (2016). Technopedia. Retrieved October 27, 2016, from <https://www.techopedia.com/definition/26002/web-based-application>.
- WD Communications LLC. (2016a). Back to College. Retrieved October 30, 2016, from <http://www.back2college.com/gpa.htm>.
- WD Communications LLC. (2016b). Back to College. Retrieved November 1, 2016, from <http://back2college.com/gpa.htm>.