

# Chapter 1 Introduction

## 1.1 Project Definition

**CTutorial4u** is a knowledge-based system, which incorporated with rule-based system architecture as the backbone to develop tutorial for C programming. One of the capabilities that distinguish the CTutorial4u as a medium for learning is the ability it provides to individual users to participate in the system as well as receive results after going through the quizzes.

The concept of knowledge management also plays a valuable role in the context of intelligent learning. All of the same elements of knowledge management exist in this CTutorial4u such as tools for capture, central database for storage and tools for help. However, the objective is to develop a resource for learners seeking to improve their understanding of C Programming. The deployment of such a system not only provides a valuable information resource, but it also promotes a sense of community amongst learners by providing them the opportunity to test their understanding in the quiz session provided.

This system offers the users the opportunity to familiarize with C Programming by providing lecture notes session. This session allows the users to refer to the notes anytime they want. It consists of ten most important chapters of C programming. The administrator (lecturers and tutors) can upload and change the notes. Then the tutorial part is for the user to visualize what they have learned. The user is required to choose the answers for each selection appeared for the domain selected. Once all the answers gathered and entered, the system will show the source code for the domain based on the selected. Only six important domains will be taught in the tutorial session. Next, the

quiz session consist of ten simple questions for each domain for the students to test their understanding of the lectures and tutorials they gone through earlier.

## **1.2 Project Motivation**

The purpose of the project is to assist and guide students and lecturers to excel in the C programming course. A tutorial is NOT a further chance for staff members to teach students. The tutorial is NOT "owned" by the tutor. All participants should own it. A tutorial should facilitate student learning and should take into account the abilities, needs and interests of each individual involved in a way that lectures cannot.

Most of the students from various public institutes and private colleges finds it hard to get an A grade or a good results in programming subjects. Reason for increase in failure percentage in C programming is because the students are least exposed to programming languages in school levels and at the same time it is normally first year course in every universities, so the students finds it difficult to familiarize and master in this course.

The knowledge design in rule based system architecture actually run based on some standard rules set in the working memory. The rules will remain the same for different runs. CTutorial4u not only serve as an exercise to a student but actually to improve basic understanding in C programming and as a tool to test their knowledge and judge ability and efficiency of answering different set of quizzes with various concepts in programming language. Other than that, actually it is easier and effective to convey the easy learning system to the students in the laboratory where installing this system in every PC will actually allow all the students to utilize it.

### 1.3 Project Objectives

CTutorial4u's main objective is to provide flexible knowledge base foundation in C programming topics such as arithmetic, control structure, function, array, pointer and file processing. Using this system, users who are not good at both programming and problem domain can get solution to a specific problem easily from the constructed rules through the interactive question and answer sequence. The said solution is in the form of C source code and incorporated with the result. The knowledge base structure is essential to the successful execution of rules underlying the processes involved in the tutorial and quiz sessions. The knowledge base designed in such a way to promote scalability, extension and modifiability to the basic design of the system.

The system consists of lecture notes to provide simple understanding of topics in C language, tutorial session to help the students to construct source code based on choice of selection and quiz session to test the user's proficiency, understanding and knowledge gained from lecture notes and tutorial session. The quiz presented with multiple-choice questions and the learner had to respond correctly. Some interesting ideas have emerged to mechanize teaching using various teaching methods. The sub objectives of the knowledge designed rule-based C Tutorial was seen as:

- save time and cost by moving towards paperless
- provide interactive learning system (user select choices of answers, system execute and manipulate the source code stored in the database based on the input),
- exploit the "law of exercise" by providing quiz,
- Provide timely and immediate feedback for tutorial and quiz.

This tutoring system is capable of interacting with the user by accepting the user input and amends the code saved in the working memory. Process the user input and fix the input into the basic program in the working memory and display the recent program code after grabbing some user input from the selection criteria such as variable type, variable value and value of the variable. The best of the tutorial session is to display the output of the program after it has been executed.

#### **1.4 Project Scope**

The tutorial includes arithmetic, control structure, function, array, pointer and file processing. Lecture notes will cover the main ten topics in C programming and presented to users in power point format whereas quiz session only has questions from six main topics covered in tutorial session. Each time a person logon to the system, it randomly chooses different set of questions based on the topic selected. The quiz set the finish time and student will be given a mark immediately after the time out.

Tutorial and quiz session is designed to evaluate the student's learning and provide constructive feedback where necessary. It is an aid to learning and not an elimination process. Vague and confusing questions will not be asked.

- Tutorial question
- Possible answer choices
- Correct answer + (feedback)

#### **1.5 Project Limitations**

CTutorial4u provides a lot of benefits but on contrary it has a few limitations as well. This system can not be accessed by users from anywhere at anytime. This system is

limited to those who have the CD. Other than that, the system is intended to be installed in all laboratories in FCSIT at University Malaya, so only FCSIT students will be exposed to the system. At the same time, the CTutorial4u does not provide any subjective questions which actually a major setback of a tutorial system. Besides, C compiler is not embedded to test whether the written codes by the users are correct nor has bugs in there.

### **1.6 Target Audience**

CTutorial4u is specifically designed to help and guide student from universities and private colleges to train and practice programming skills and test their ability through the quiz session available. On the other hand, tutorial session will be reference to their programming logic. At the same time, users of the systems will be lecturers who would like to refer to the system for some kind of quiz questions with answers based on the chapters available in the course, which will make their work easier. Targeted audience is beginners and intermediate users of C programming tools.

### **1.7 Project Expected outcome**

The system is expected to be user friendly. The tutorials will be designed in a manner to cover all the topics in C programming. Standard C programming topics will be analysed based on various reference books available in the market to produce the tutorial session.

In quiz session, each time the person logon to the system, it randomly choose different quiz question. The quiz set the finish time and student will be given a mark immediately after the time out. It is attached with [Good] message if they get more than

50% and [Try again] message if they get less than 50%. Apart from that, the quiz session has embedded interface metaphor in human computer interaction concepts. If the answer for the question is correct then, there will be correct sign [✓] on the question coloured green and wrong sign [X] on the wrong answer coloured red. Lecture notes as a supplementary feature which to be in power point format.

### **1.8 Project Development Methodology**

Linear Model of Knowledge engineering suits the best for developing Ctutorial4u since it's a rule-based system because it is better to adopt a system development strictly designed for expert system and it will be further described in detail in chapter 3.

### **1.9 Project Schedule**

The project is a 2-semester project. For the first semester, standard questionnaires will be prepared and delivered to local universities and some private colleges. At the same time, other similar system or system which serves the same purpose will be analyzed to get new ideas and to improve the existing setbacks. Collected data will be analyzed and based on the analysis the new system will be planned and a simple screen designs will be scratched. Prototype of the system will be developed similar to the paper scratches.

On the second semester, based on the comments from supervisor and some of the colleagues, the prototype was redesigned. The real system design took place during second semester. The system was tested and evaluated by a number of students and tutors of FCSIT, UM. The documentation is submitted to the internal and external to examine the documentation. The formal presentation on the system was held on 9<sup>th</sup> October 2004 to all the faculty members of FCSIT, UM. The gantt chart of the project schedule is as in the Figure 1.1 in the format of MS Project.

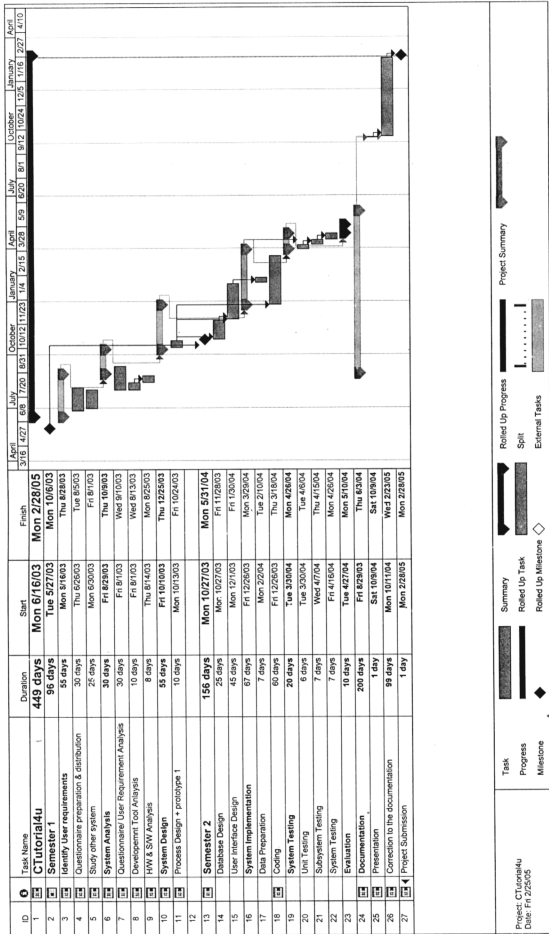


Figure 1.1: Gantt chart of CTutorial4u