



Deployment of Modularity to Enhance the Software Code Reusability by Maintaining Code Repositories for Multiple Programming Language

K. VidhyaDr. MCET, Pollachi, Tamil Nadu,
India**A. Brunda**Dr. MCET, Pollachi, Tamil Nadu,
India

Abstract: *In current scenario, abundance of software development companies busy in doing plenty of projects and reusability is emphasized. As they are dealing with more number of projects, sometimes they may get new projects which are very/somewhat similar to what they worked already. So some or most of the modules which are developed already may be reused. The key challenge is finding the appropriate code. To face this challenge code repositories (Programming language wise) may be maintained in each company and the software code modules already developed are stored and retrieved according to the need. This system helps the Project manager to store the code (module wise) in the appropriate repository and makes the searching easier.*

Keywords: *Modularity, Reusability, Code repository.*

I. INTRODUCTION

Modularity refers to the way that a product design is decomposed into different parts or modules (1). MacCormack et al say Modularity yields three main advantages. First it makes the code manageable by breaking a complex system into number of smaller systems, Second this helps to complete the work faster by getting the work done in parallel. Third accommodation of change in the system may be incorporated with minimal impact on the other part of the system. In addition to the above discussed, the modularity also plays a very important role in code reusability. Any other system being developed does the same function as the one developed, then the particular module alone reused which saves the resources in terms of money, time and manpower.(1)

Software reuse is a process of developing new software systems from existing code instead building software systems from scratch (5). Software code reuse assures not only increased efficiency but also improved software quality and better maintainability(5).

II. CODE REPOSITORIES

In this era, people started migrating towards automation and so software development companies are busy in building systems according to the customer needs. Sometimes this may happen that the companies will get similar type of project what they have developed before. At that time they can make use of the code which is already developed. The key challenge is finding the appropriate code. The companies may face some issues like

- Project Manager (PM) who developed the project (who has complete knowledge about the project) may leave the company and this happens often.
- If a module is needed for reuse, then the old project which has that code should be identified and then the code should be searched in the project manually
- Time spent in searching the code may be higher than the development time

To overcome the above discussed issues, code repositories may be developed(7) and code modules which are being developed are stored. Programming Language wise repositories still improve the effectiveness. Each repository will have module wise code of previously developed projects. The repositories can be used for new software development for software reuse. Adding the code to the repository, maintain and searching for any module manually is a time consuming process. So it should be done systematically. A system is developed to accomplish this with the following functionality and the figure 1 represents the block diagram of the system

- Accepts a software file as input and identifies the language in which it is developed
- Identifies the Module
- Asks the PM to name each module and saves the file with the same name in the repository (The access rights to the repository may be given only to the project Managers and top level people)
- Accepts the file name and programming language to perform search operation in the appropriate repository and retrieves the file if available.

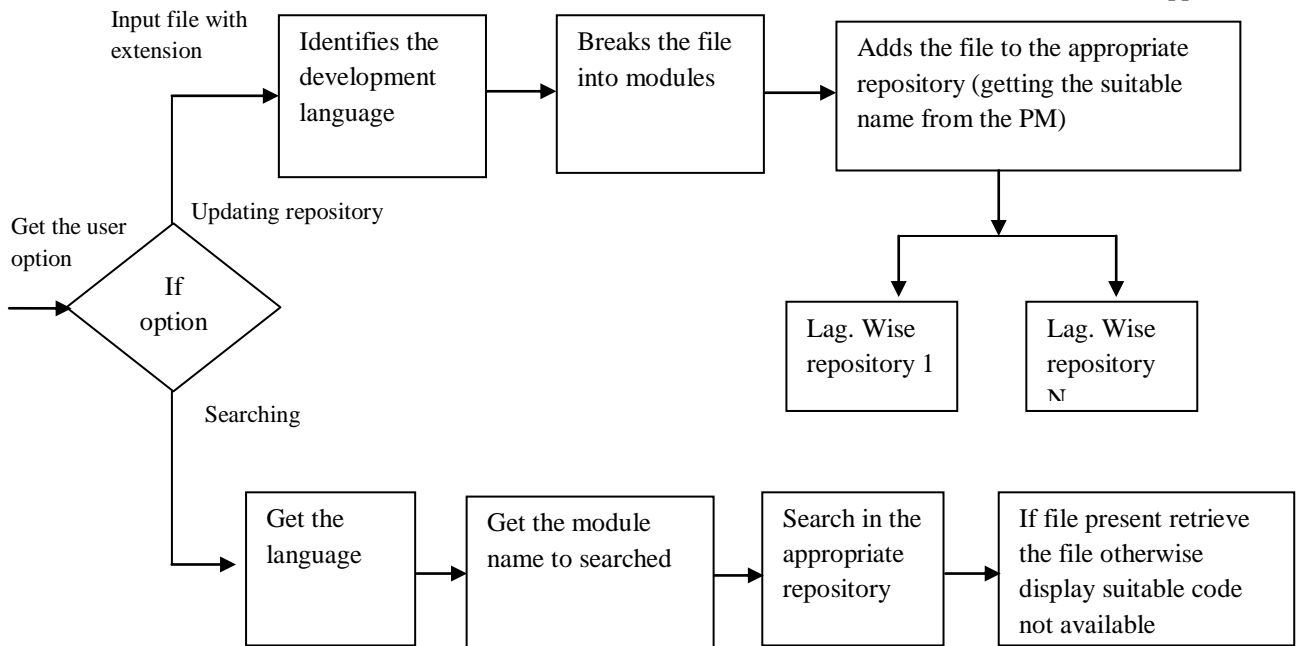


Figure 1. Block Diagram of the system

The system which is developed gives the users (The PM or the top level employees with access rights) with two choices. If the user wants to update the repository then it asks for the file .Once the user inputs the file, the system identifies the programming language being developed, breaks the file into modules and asks the user to name each module and it is stored in the repository. Suppose the user goes with the second choice that is searching then the system asks the user to give the name of the module to be searched and the programming language to search in the appropriate repository. System retrieves the module if available, otherwise gives a message to the user about the code unavailability.

III. CREATING REPOSITORIES

Code repositories are created in specific to the programming language. Repositories may be maintained in the server system so that it can be accessed from anywhere. New repositories are created through create new repository option in the system as shown in the figure 2.

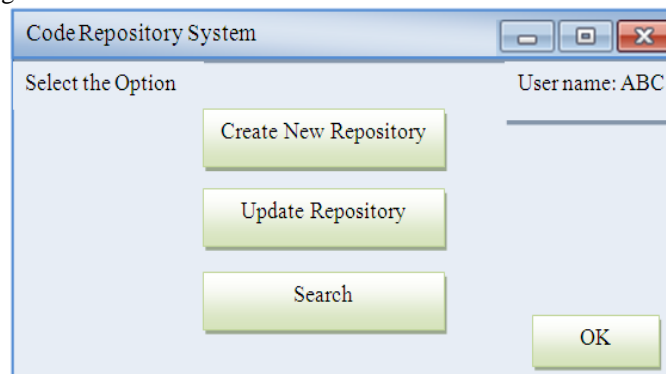


Figure 2 Code repository system

Here, in this system repositories are created for four programming languages and it can be created as many as needed. The figure 3 shows the snapshot of a server system with 4 repositories

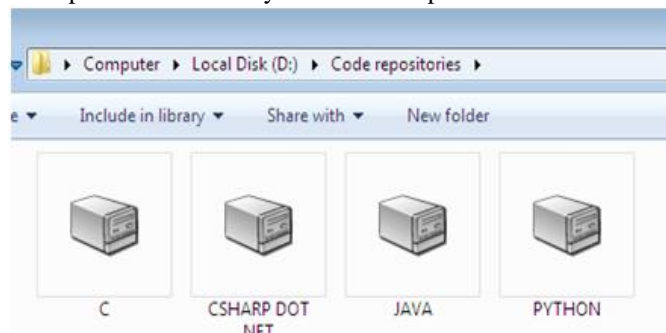


Figure 3 Code repositories

IV. UPDATING REPOSITORIES

Once the project is completed the project manager may wish to update the repository. If update repository option is selected then the system asks the user to input the path of the file. The system opens the file or folder and reads the contents. The programming language is identified with the help of file extensions. After identifying the language appropriate function is called to identify the modules in that system with the help of that programming language syntax. The system asks the user to name each and every module. Proper naming should be done to identify the code during the searching process. Naming the module is a very critical and important part in this system. The user should give a meaningful and appropriate name to accomplish the reusability of the code.

For example if a function is defined in C sharp to implement the login by validating the text box then the module is stored in the appropriate repository with the given name. Figure 4 and 5 depict how the repositories are updated

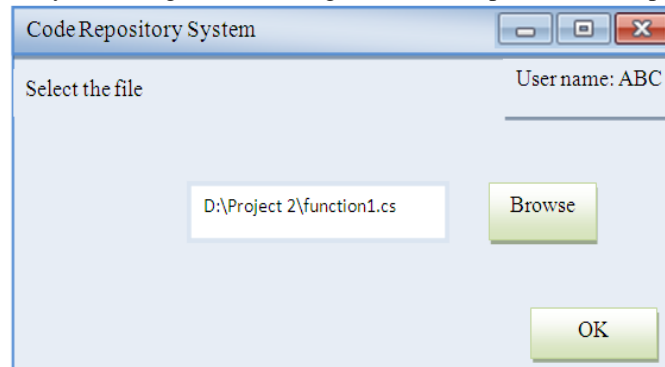


Figure 4. Selecting a file to store in the repository

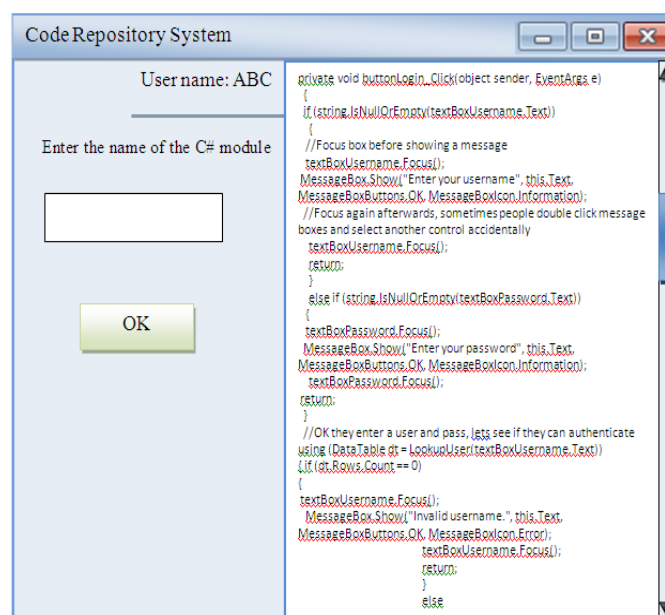


Figure 5. Naming the module to be stored in the repository

V. SEARCHING THE REPOSITORY

On receiving a new project the project managers may wish to search for the repository to reuse the already developed code. Since the repository has the collection of all modules developed in the company, a PM has the liberty to take the code placed by any other project manager in the company.

The PM should select the search option and needs to input the function name and the programming language looking for. Then the search function of the system takes the file name and search in the suitable repository. The search operation first performs the direct search and no such file is found then it takes the synonyms for the words in the file name and performs the search again. If file available it retrieves the file otherwise declares the file unavailability through a message to the user

VI. CONCLUSION

The code repositories may be useful for the developers to locate the already developed file and reuse it which increases their efficiency and Excellency (3). Since maintaining and locating the correct project and module manually takes longer time. This system helps to update and retrieve data from repositories.

The system may be extended by considering majority of the programming language in trend which improves the effectiveness of the system

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