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PROGRAM PROJECT DEVELOPMENT LIFE CYCLE MODEL

МОДЕЛЬ ЖИТТЄВОГО ЦИКЛУ РОЗРОБКИ ПРОГРАМНОГО ПРОДУКТУ

The paper proposes a new model of software life cycle, which allows to improve the phase formation specification. This makes it possible to calculate the preliminary cost software development, reduce risk and to design stage vehicle to develop a prototype user interface and generate code.

Key words: life cycle, software, technical problem, computer-aided design, complexity

Запропоновано нову модель життєвого циклу програмного забезпечення, яке дозволяє поліпшити специфікацію фазоутворения. Це дає змогу розрахувати попередню розробку програмного забезпечення вартість, зменшити ризик і стадії проектування автомобіля, розробити користувальницький інтерфейс, прототип і генерувати код.

Ключові слова: життєвий цикл, програмне забезпечення, технічна проблема, комп'ютерний дизайн, складність

Introduction

In present design automation systems affected all types of industries, from manufacturing household appliances to aircraft. However, in software development, there are no automated system that will automate the process of its development. Such systems as UML allow to get only time diagrams without accurate calculation, with plenty of time for accuracy. Thus, the development of new approaches automation software is an actual task, and therefore, the research theme devoted to model development life cycle software development, is important..

Development of the graph depending on selected options

Based on the model proposed in [] write down the necessary model parameters that are sufficient to develop a mathematical model for calculating the complexity and cost of software at early stages of requirement specification in this form (Mm):

$$Mm=<L> U< SQL> U<DLW> . \quad (1)$$

Affiliation graf for the high-level programming language C ++ is shown in Fig. 1.

Affiliation graf for structured language SQL is shown in Fig. 2.

Affiliation graf for user interface is shown in Fig. 3.

Mathematical model of the complexity and software cost calculating

Suppose there is a set of object-oriented languages L' and the set DLW' ((UI elements that exist), then the expressions $L \in L'$ and $L \exists DLW(DLW \in DLW')$ and show that certain object-oriented language belongs to its own syntax description of the user interface, therefore, if and only if the mathematical model development PP for the CIS TPP (technological preparing of production) can be represented as follows:

$$\forall Mm \equiv L(L \in L') \wedge DLW(DLW \in DLW') \wedge SQL(SQL \in SQL') . \quad (2)$$

According to the affiliation graph for a structured language SQL, presented in Fig. 2, and (2) give the mathematical model (3).

$$\forall Mm \exists SQL(SQL \in SQL') \rightarrow \forall SQL' \equiv STBD \wedge WAR \wedge WST \wedge LT . \quad (3)$$

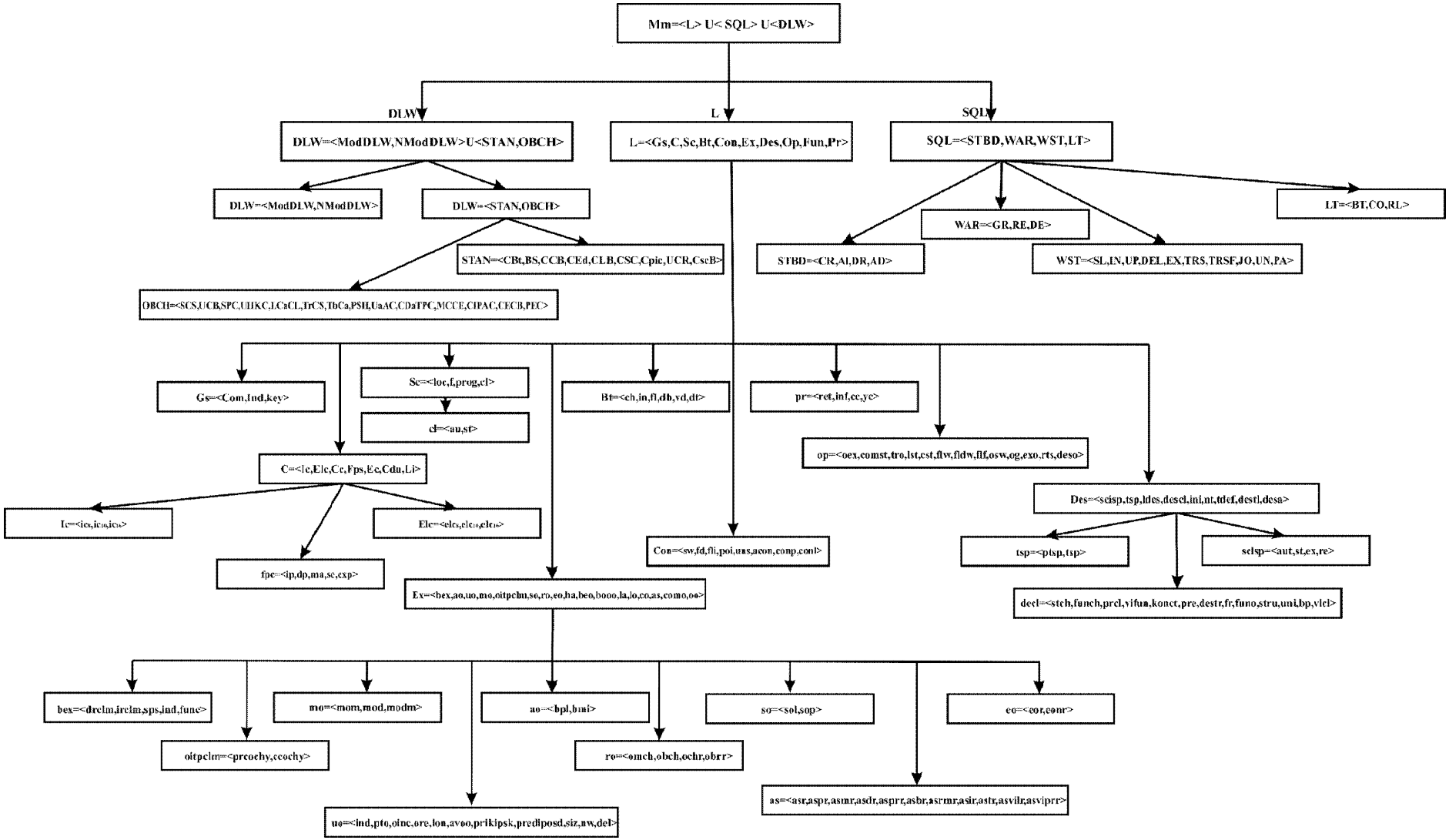

Fig. 1. Affiliation graf for the high-level programming language C ++

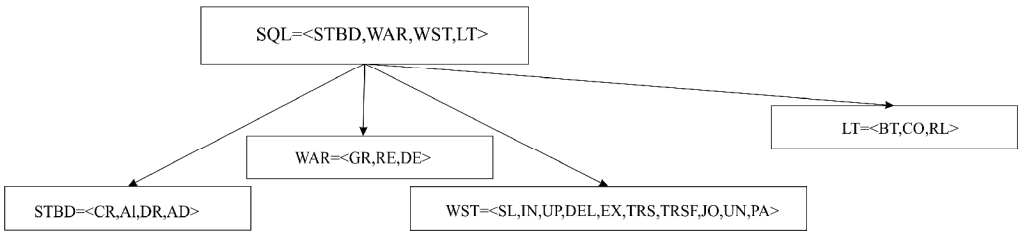

Fig. 2. Affiliation graf for structured language SQL SQL

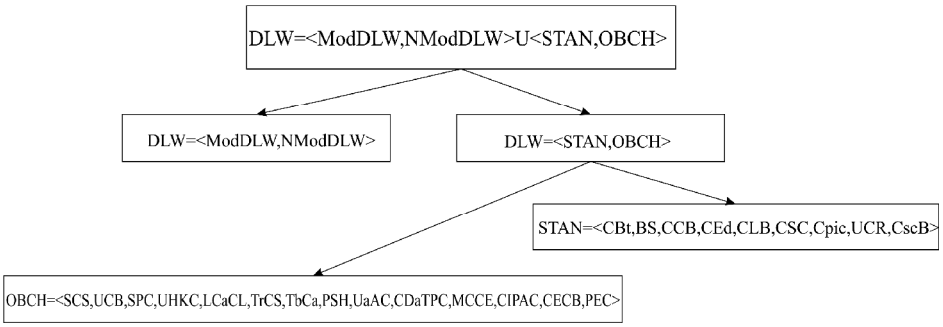

Fig. 3. Affiliation graf for user interface

To prove the adequacy and capacity of mathematical models use for the complexity and cost of emergency calculating, we describe a mathematical model for parameter STBD:

$$STBD \equiv \exists CR(CR' \in CR) \cup DR(DR' \in DR) \cup AL(AL' \in AL) \cup AD(AD' \in AD). \quad (4)$$

Based on the mathematical model (3) we can get a syntax description for the procedure to create tables for the database under the following mathematical representation depending parametric model and syntax of existing commands (4).

Parameter CR mathematical model for the group of create objects commands on the example instructions CREATE TABLE:

$$\forall CR(CR \in STBD)\exists \sin t(таблица(поле\_1\_тип[(размер)][NOT\_NULL]$$

$$[WITH\_COMPRESSION \,|\, WITH\_COMP]$$

$$[индекс\_1][,поле\_2тип[(размер)]][NOT\_NULL]$$

$$[индекс\_2][,...]][,CONSTRAINT\_составнойИндекс[,...]]).$$

Parameter AL mathematical model for group of changes objects command in the example instruction ALTER TABLE:

$$\forall AL(AL \in STBD)\exists \sin t(таблица\{ADD\{COLUMN\_тип\_поля[(размер)][NOT\_NULL]$$

$$\|[CONSTAINT\_индекс]\}|ALTER\{COLUMN\_тип\_поля[(размер)]$$

$$\|[CONSTAINT\_составной Индекс]\}|DROP\{COLUMN\_поле\_1\_CONSTAINT\_имяИндекса\}\})$$

Parameter DR mathematical model for group of deleting objects commands on the example instruction DROP USER:

$$\forall DR(DR \in STBD)\exists \sin t(пользователь[,пользователь,...][FROM\_группа]).$$

Parameter AD (add items) mathematical model on the example instruction ADD USER:

$$\forall AD(AD \in STBD)\exists \sin t(пользователь[,пользователь,...][TO\_группа]).$$

According to the affiliation graph to the user interface DLW, shown in Fig. 3, and according to (1) give the mathematical model that is shown below

$$\forall \mathrm{Mm}\exists DLW'(DLW' \in DLW) \rightarrow$$

$$\forall DLW \in ModDLW'(ModDLW' \in ModDLW) \vee$$

$$NModDLW'(NModDLW' \in NModDLW)\ \ STAN'(STAN' \in STAN)\ \ OBCH'(OBCH' \in OBCH)$$

B Based on the proposed mathematical models and with creating the database syntax, at an early stage of technical task development we can generate and calculate the length of the code that will make PP cost and complexity calculation possible.

Life cycle models development for the CIS TPP development

The software development life cycle models were analyzed based on the standard ISO / IEC 12207 and found that these models are not able to take account of specifications in the development of CIS TPP. To develop a new approach to the early stages of technical task development and the possibility of calculating the complexity and cost of the risk reduction a new model of software development life cycle was offered. Life cycle model Jump is shown in Fig. 4.

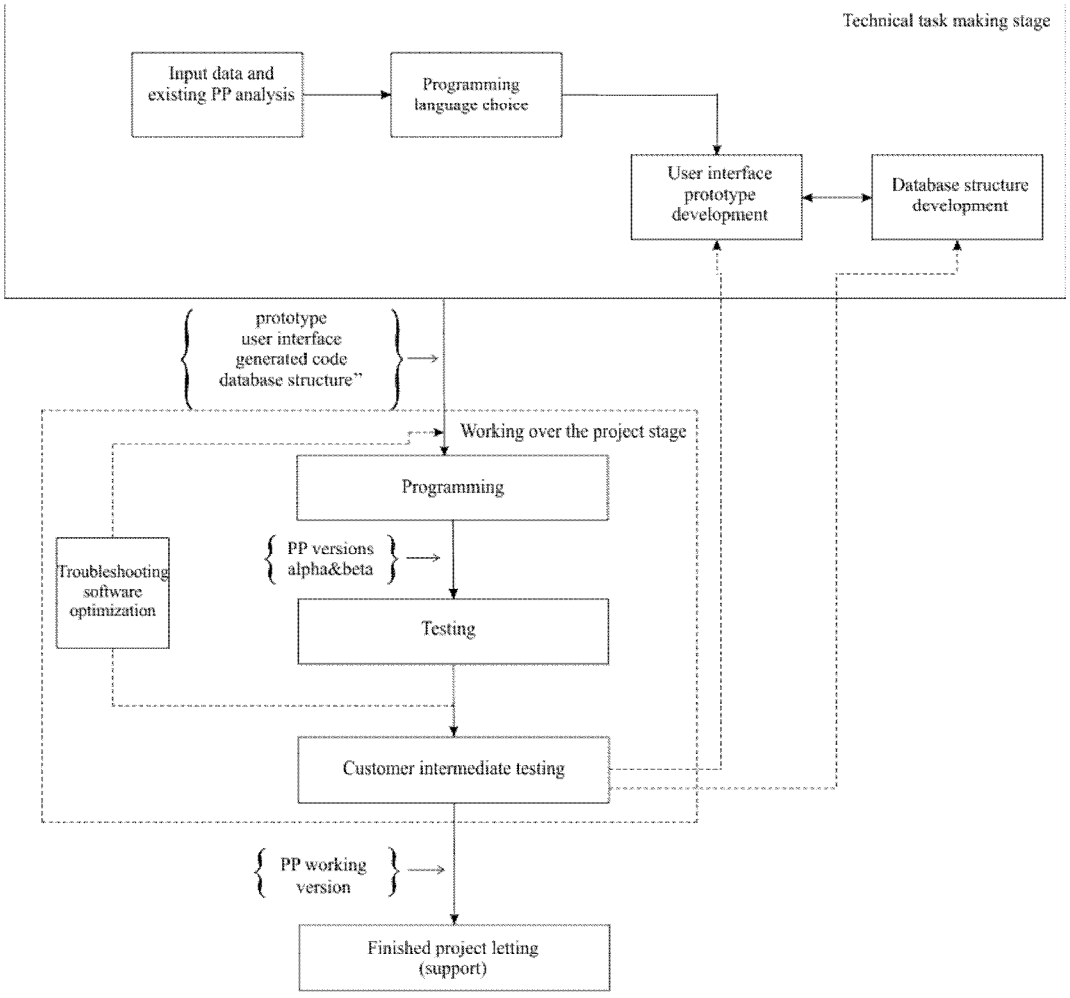

Fig. 4. Life cycle model Jump

At the stage of technical task development involved developer and the customer, of existing data and the PP are analyzed, then select the programming language, specifies basic and advanced features that are required for correct operation of the PP. Based on requirements user interface is developed, deviation is minimized and arrangement of basic controls PP is optimized, an information operation sequence graph PP is built. Based on the user interface structure of the database is developed, the database is selected, key information files storage and the relationship between them are discussed.

After this stage completion a user interface prototype with generated code PP on object-oriented language with logical and physical database model is got. On the basis of information complexity, cost and risk developing PP are calculated.

At the working over the project stage design is programmed and refined, missing pieces of code are appended. Then we get versions that are tested in development, unit testing, integration testing and system testing. If there are errors at any stage of testing, we return to the stage of programming, eliminating and optimizing code. After all the improvements project the customer tests PP.

If after this stage there was a need to introduce a new module, changes in the interface or having trouble with the volume and flow of necessary information, there is an opportunity to return to the stage of vehicle development block in the user interface or database structure.

After completion of the work over the project PP working version comes, that took all the necessary revision and testing, and the project seems to continue to have support.

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AUTOMATIC QUADRILATERAL MESH GENERATION FOR NON-CIRCULAR SHAFT PROFILES

АВТОМАТИЗОВАНЕ ГЕНЕРУВАННЯ ЧОТИРИКУТНОЇ СІТКИ ДЛЯ НЕКРУГЛИХ ПРОФІЛІВ ВАЛА

This paper is devoted to a technique for automatic generation of quadrilateral meshes for shafts and hubs with non-circular profiles.

Key words: quadrilateral mesh, mesh optimization, mesh smoothing.

Запропоновано методику для автоматичного створення чотирикутної сітки для валів і втулок з некруглими профілями.

Ключові слова: чотирикутна сітка, оптимізація сітки, згладження сітки.

1. Introduction

In order to conduct simulation modeling and research for the stress-strain state of the connection of a shaft and a hub, it is necessary to generate a high-quality quadrilateral mesh for these two connection