# THE DEVELOPMENT OF THE AUTOMATED LEARNING SYSTEM

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Abstract. The development of the automated learning system "Programming Technologies" is designed to automate the process of teaching students the basics of programming and improve the effectiveness of their memorization of theoretical and practical programming skills. The main goals of creating an automated learning system "Programming Technologies are to provide students of the Faculty of Computer Science and Technology with an automated learning system to obtain theoretical and practical information; reduction of labor intensity, training time and formation of practical programming skills; collection of statistical information on the time of mastering by students of the discipline "Programming Technologies". To achieve this goal, it is necessary to solve the following tasks: At first to analyze the existing approaches to the formation of an adaptive module of an automated learning system, which is adapted to an individual user of an automated learning system. Second to develop software for the adaptation module of the automated learning system, which is adapted to the individual user of the automated learning system in the discipline "Programming Technologies".

Keywords: automated system, programming technologies, development.

# РАЗРАБОТКА АВТОМАТИЗИРОВАННОЙ СИСТЕМЫ ОБУЧЕНИЯ

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Аннотация. Разработка автоматизированной системы обучения "Технологии программирования" предназначена для автоматизации процесса обучения студентов основам программирования и повышения эффективности запоминания ими теоретических и практических навыков программирования. Основными целями создания автоматизированной системы обучения "Технологии программирования" являются обеспечение студентов факультета компьютерных наук и технологий автоматизированной системой обучения для получения теоретиче-

ской и практической информации; сокращение трудоемкости, времени обучения и формирование практических навыков программирования.; сбор статистической информации о времени освоения студентами дисциплины "Технологии программирования". Для достижения поставленной цели необходимо решить следующие задачи: сначала проанализировать существующие подходы к формированию адаптивного модуля автоматизированной системы обучения, который адаптируется к индивидуальному пользователю автоматизированной системы обучения. Во-вторых, разработать программное обеспечение для адаптационного модуля автоматизированной системы обучения, которое адаптируется к индивидуальному пользователю автоматизированной системы обучения по дисциплине "Технологии программирования".

Ключевые слова: автоматизированная система, технологии программирования, разработка.

When using the automated learning system "Programming Technologies", it becomes possible to independently study programming languages, taking into account the individual characteristics of the processes of memorization and obtaining practical skills by an individual student. In addition, it is possible to optimize the process of mastering the material on the basis of passing a test submission of the material. In addition, it is possible to maintain a single database for each student. Therefore, the effectiveness of the implementation of the automated learning system "Programming Technology" is expected by optimizing the time for reading and memorizing information, depending on the characteristics of each of the students. System requirements are presentation of lectures, practical and laboratory classes in accordance with the curriculum; automatically carry out the supply of any material, taking into account.Individual characteristics of each student; generating statistics and reports for each student; timely receipt of information about the basics of programming at any time without reference to the schedule of classes. The automated training system "Programming Technologies" should be implemented in the form of subsystems: "Lectures", "Practices", "Laboratory work", "Testing", "Statistics" and "Reference books and reports".

To prepare the IP for commissioning, it is necessary to: appoint an official in the Customer's organization responsible for the acceptance of the system; to install a set of technical means that meet the requirements of the relevant TOR at the workplaces of employees of the Customer's organization who must participate in the operation of the EPA; together with the Contractor, perform the installation of the software in accordance with the Developer's Manual; to enter the data of the reference information and configure the system in accordance with the Developer's Guide; together with the Contractor, draw up the document "The program for verifying the effectiveness of the EPA"; conduct tests in accordance with the document "The Program for verifying the

effectiveness of the EPA"; if the test result is satisfactory, sign the act of technical readiness of the system for trial operation. If there are comments, draw up a document "List of suggestions and comments for improving the system"; train potential users to work with the EPA in the scope of the User Manual.
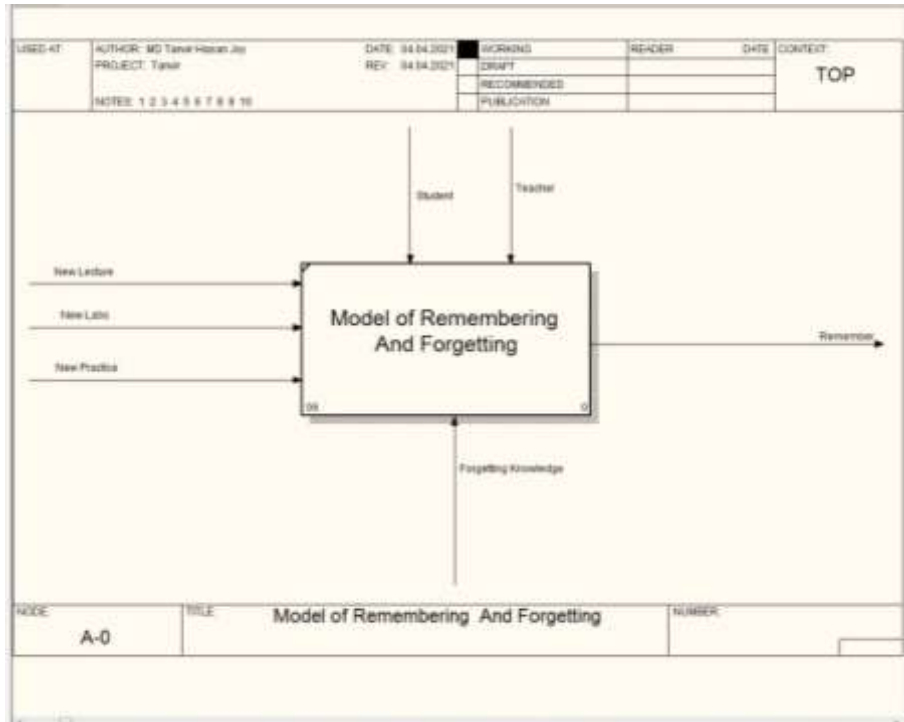


Figure 1 – Context diagram

Table 1 —Arrows of the context diagram

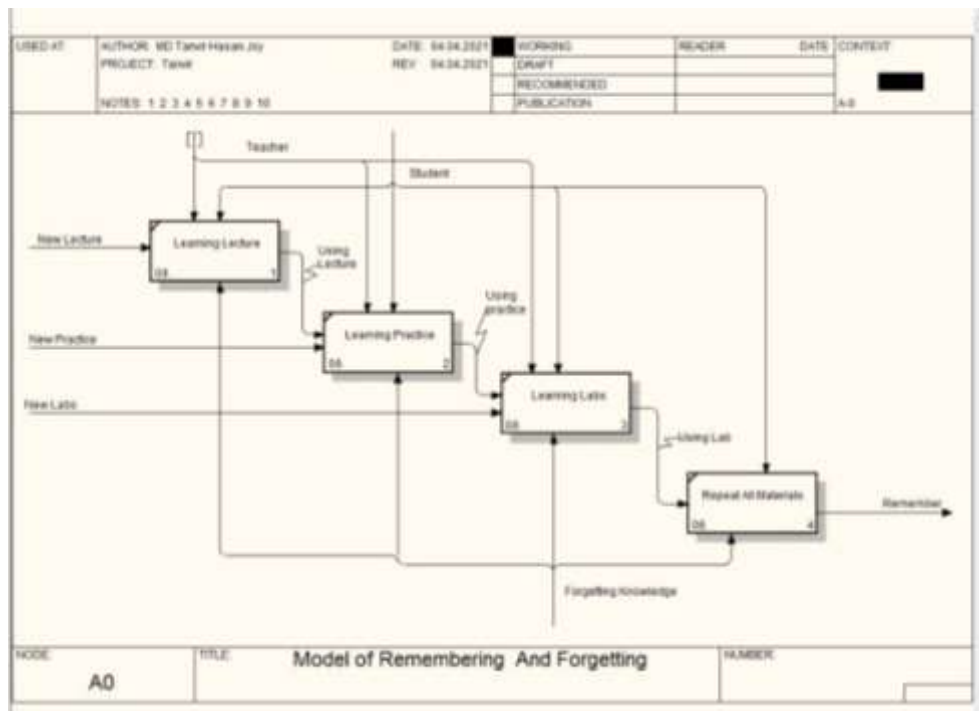| Arrow Name (Имя стрелки) | Arrow Definition (Определение стрелки) |
|---|---|
| New Lecture | Reading Lecture and doing Actions |
| New Labs | Creating Labs or code |
| New Practice | Doing Actions |
| Forgetting Knowledge | Continuous Time |
| Student | Present or Absent |
| Teacher | Present in Physical or Online |
| Remember | Volume of Knowledge |

Figure 2 – A0 decomposition diagram

To ensure the functioning of the system, it is necessary to develop operating regulations that provide for the work of users and support services.The functioning of the AOS should be provided by programmers of the Department of VT and IS, as well as teachers of the Department of VT and IS, who are responsible for supporting the operation of the system and monitoring compliance with the requirements set out in this document.

At the end of the trial operation, the maintenance service transmits to the system acceptance commission a list of comments on the operation of the system. The Commission considers the comments and decides on the readiness of the system for operation at the University. If the commission confirms that the system is ready for operation at the university, an act of commissioning and acceptance of the system at the university is signed within seven days. Otherwise, the commission transmits the agreed protocol of comments to the developers. The system is considered to be put into operation at the University after the signing of the act of acceptance of the system by the official responsible for the acceptance of the system. If significant inconsistencies between the characteristics of the system and the requirements of the TOR are identified, the Customer draws up a reasoned list of comments, which is signed by the responsible person of the Customer and transmitted to the developers to finalize the system.
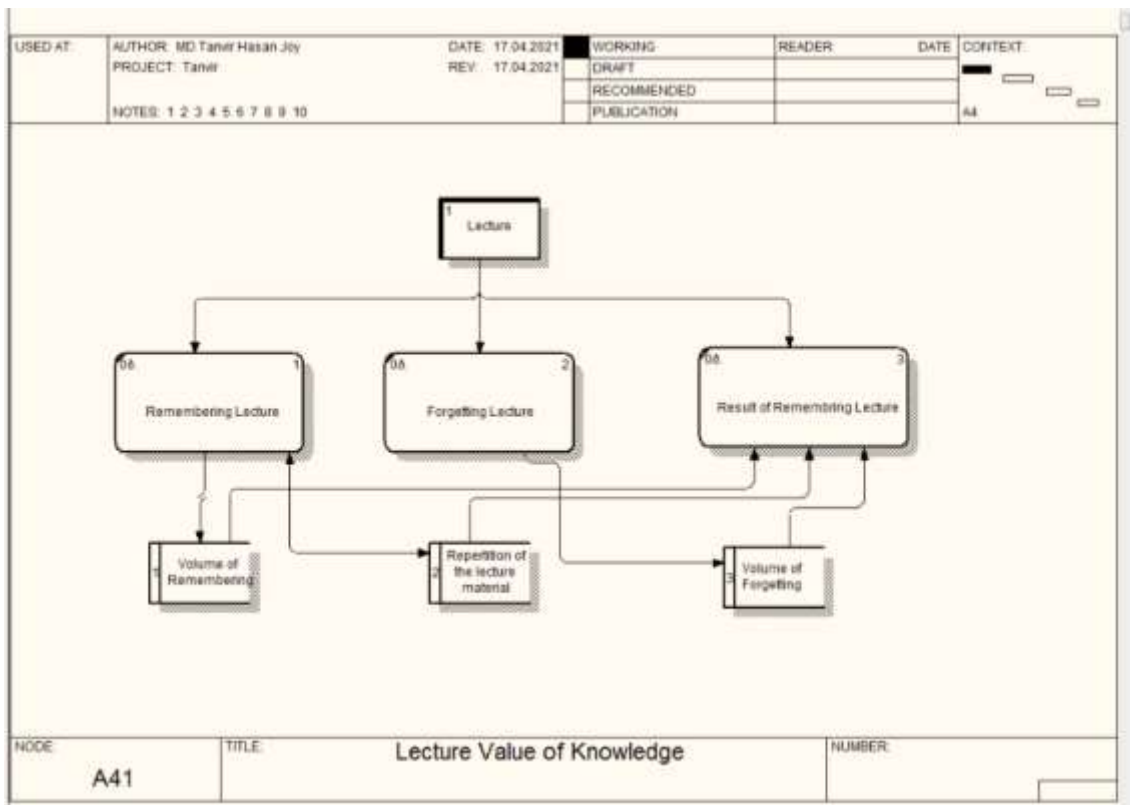
Figure 3 – A4 - decomposition diagram

Conclusion

The use of information systems makes any production more competitive and profitable by increasing its manageability and adaptability. Such automation makes it possible to increase the efficiency of management by providing managers and specialists with the most complete, operational and reliable information based on a single data bank, and reduce the cost of finished products due to optimal management of technological processes. A pre-design survey of the learning process was carried out, a technical task for the creation of an automated training system "Programming Technologies" was developed, a technical project of an automated training system "Programming Technologies" was created.

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