

The research on the teaching method of C language

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Abstract. In order to adapt to the development of society, the teaching of C language requires that the students of non-computer majors should have some programming skills, which can cultivate the compound innovative talents. According to the actual situation of students in universities, this paper researches teaching methods of C language from the whole to the part, which hopes to get better results in teaching. The teacher only uses the good teaching methods, the students can grasp the good study method. Thus we believe that the students does not think the course difficult.

Introduction

At present, the great achievements of almost all areas are benefited from the support of computer science. Computer science, scientific theory and experimental science are three means of promoting social progress and development of science and technology. Today, any one is known as the high-tech project, profession, which is all close with the computer. Computer language not only provides a good way to solve the problems in all the fields, but also provides a unique way to deal with the problem. It is an important class to cultivate college students' comprehensive quality. In order to adapt to the development of society, the teaching of C language requires that the students of non-computer majors should have some programming skills, which can cultivate the compound innovative talents. According to the actual situation of students in universities, this paper researches teaching methods of C language from the whole to the part, which hopes to get better results in teaching.

The research on the teaching method

Integrated teaching method

The grammars of C language are too much, the knowledge points are scattered, and the transformation form of the grammars are too much. In the limited class time a comprehensive case is essential how to effectively organize the teaching content and how to connect the fragmented knowledge point. C language teaching in our school uses the book of 《The program design course of C language》 written by Professor Bencan Gong. The student's information management system is used as an example throughout this book that starts from the development steps of practical application system, cultivates the students' basic programming skill gradually from shallow to deep, helps students master the grammatical knowledge of C language, guides the students to master the writing the program of large scale applications. Case teaching method can reorganize teaching in the classroom by breaking the order of the original teaching completely. In the application of the actual case the students can explore and understand these basic concepts. The teacher summarizes and extends the concept timely so that the students learn new knowledge of C language in a relaxed and pleasant atmosphere. Case teaching method selects the case of the program design as the center, lets the students focus on the specific case, puts the grammar and the concept into a specific case. The whole teaching process emphasize studying in the application so as to avoid the boring theory, which not only can increase the students' learning interest, but also can improve students' ability of comprehensive analysis and solving practical problems. In the actual teaching activities, the students are divided into 6 to 7 people per group. Under the teacher's guidance, the students analyze the source code of the case, exchange the

problems and the ideas in analysis process . After the students discuss the case, the teacher should make comment timely, and teach theoretical knowledge and skills used in analyzing the case again. Finally the teacher lets the students submit the corresponding analysis report, thus the students can grasp the professional knowledge firmly. In all, the teacher and students' organic combination can be realized, the students can improve their ability of practical application.

The contents of teaching C language in our school is mainly about the data types, the program design of the branch structure, the program design of loop structure, the array, the function, the pointer, and so on. If you teach simply by the order of the textbook, the students cannot establish a whole concept, and they will soon return the knowledge to the teacher after class. If the teacher integrates the above contents according to the connection between knowledge points, the contents of teaching C language can be sorted into the data types, the program structure and algorithms, the functions, the documents and other parts. First, the teacher introduces the basic knowledge of the basic data types, operators and expressions that has extensive transfer value. As in the teaching of language courses, at first learning word is the main teaching content. Then the teacher introduces "structured program design" that is equivalent to the "sentence pattern" in teaching language. These two parts of the knowledge is the basic knowledge of C language. Then the teacher can arrange the rest of knowledge points.

Data types include basic types, array types in structured types, structure type, common types, pointer types, and so on. The teacher explains these concepts gradually from the shallower to the deeper. For example, we put the same type of basic data types together, which is an array types, we put the different types of data together, which is a structure type, etc. Finally, we teach the pointer variable, it can store not only the address of the ordinary variable and array elements, but also the address of the array variable of the structure and its elements.

The programming process is the process of the algorithm formation, the algorithm achievement to the transformation of structured program. First of all, the students need to form the correct thinking in order to develop students' programming ability. When there is a problem, the teacher lets the students to think about what to do firstly, and what to do next; discuss the situation can be divided into several cases and whether there is need to repeat what to do. The teacher guides students to solve a problem by several ways, analyzes which has the smallest steps of algorithm and computation amount, explores the logical rigor of the algorithm and so on. When the students have their own ideas, the programming will become simple: the above ideas (that is the algorithm) transform into a flow chart, then structured encoding can achieve the program framework. The teacher teaches the common algorithms of C language, expands the programming ideas and establishes contact, guides students to know the laws and apply them to their own programming.

Function is the basic unit of modular programming. While we write large programs, we often use the idea of modular programming. Firstly in accordance with the function the system can be divided into a number of modules, and then we can write the corresponding function of each module. Because the function of each module is simple, and the scale of the program is not big, it is easy to write programs and debug, and can improve the readability and maintainability of the program. The function can be explained by the introduction of small programs. The students like to put all the code in function of main, while the function can be independent by some function, then through the function of the main these small functions can be called. Let the students grasp the difference of the two forms from the overall, understand the function of modular program design, form initial impression of the modular.

When the documents are taught, the teacher should let the students understand what the file is firstly, why we need the file, the difference of the storage location of the file and previous variables, and other basic concepts. For the operation of the file the teacher teaches opening, closing, reading and writing the file, and etc.

Other aspects of the content are relatively simple, we don't discuss no longer.

The expansion of teaching

The teaching of C language need cultivate the students' overall and systematic thinking ability. Let us observe the entire teaching contents of C language. If the students can substantially divide all of the contents into data types, structure and algorithm of program, function, file after they have learned C language, the students can grasp basically the overall framework of C language, and read the textbook of C language more and more thinly. However these are the only scattered large bones. If the students can find a link between the knowledge points and put them together, a complete and meaningful skeleton can be formed. Let the students find the inner link between the knowledge points and the large bones can be put together organically. Thus the students can learn the knowledge more flexibly, and also imperceptibly cultivate their overall and systematic thinking ability.

The teaching of C language should cultivate the students' comprehensive and meticulous thinking ability. We take a problem of the choice structure for example. According to the merchant's operating income we computer his tax number. The thinking of solving the problem is to use a variable (income) to receive the input of business income from the keyboard, and then computer how much the tax is according to the different range of the income. The students often only take the right input into account and very few students will think what should be done once the input is error. So we should see the problem comprehensively, consider the problem from multi-faceted and multi angle, study the possible situation and consequences that could occur, and then solve the problem properly after analyzing carefully.

Finally the teaching of C language should cultivate the students' logical and structured thinking ability that is a clear and order thinking ability.

Interest is the best teacher. From the psychology, learning interest is the tendency of the psychological like and pursuit to learning that is related to a certain emotional and has the relative stability and strong continuity. Students' learning interest can make them understand and explore actively. And at the time, they are not afraid of difficulties, can focus on a long time. So in the course of teaching, the teacher should pay attention to cultivating the students' interest in learning, seizing the students' excitement, and mobilizing the students' thirst for knowledge. For example, before the course of C language, the teacher firstly gives the students a few examples: small games with C language, or a small program solving a more difficult math problem. Thus the students can perceive the charm of C language, and their interest in learning can be stimulated. Don't always ask students to solve the problem step by step. Let the students find the solution by themselves, give them the learning initiative. Let them become real masters of learning. In the teaching, the teacher should discover the students' good learning method, the learning thought and the understanding of the C language in time, and mobilize the enthusiasm of the whole students, so that the teaching effect can be obtained.

The research on specific teaching method

Metaphor teaching is a teaching method that makes students better understand and master the new knowledge by vivid metaphor (example that is easy to understand in daily life), which has the characteristics that is easy to accept and is not easy to forget. The teaching content of C language is abstract, and is not easy to be understood and accepted by the students. Therefore the teacher should simplify the complex contents and the profound theory. In teaching the teacher can use the examples in daily life. The distinct metaphor is most likely to be accepted by the students. The pointer is a teaching difficulty of C language. Let the students know the pointer is the address that is the room numbers. Each room has its own numbers. The person in the room is like the data in the memory. The pointer is the key to open the room. The two operators of the pointer is & and *. The operator & is seeking the address for the operand of the pointer. The operator * is evaluating for the pointer variable.

The teacher summarizes the debugging errors that students usually make in studying the C language such as input errors, uninitialized, expression errors ,logical errors and so on, designs the corresponding examples which are analyzed and interpreted in the class and compiled in the software, presents operation mistakes or the results of errors. The demonstration is shown as follows: ①

drawing flow chart according to the question②writing and compiling programs by the compiler③reporting errors by the software ④modifying the flow chart and code, compiling program until getting the right result ⑤summarizing and expanding problems that are advantage: Listing common mistakes will inform students of how to read program errors, which help them to revise the errors with correct code. Such activities lead to students deep consideration, arouse students' attention and help students realize why there are errors in programming. At the same time, students' weak link in knowledge and thinking can be fully exposed by this way in the C language course, which can speed up their understanding towards the notional grammar, improve their programming abilities and help students have a good ability of programming.

The teaching of C language should pay attention to the training of programming standards, make the student develop good programming habits. First of all, the students should pay attention to the writing format of the program. Only in this way we can make the program more beautiful and readable. In addition, some writing habits will lead to the mistakes in grammar. Secondly, C language is a language that can directly use the memory, so the concept of memory in the C language is very important. The teacher should strengthen the students' awareness of using and managing the memory. The documentation is an important part of the software products, so the students should be aware the importance of the software documentation.

Before the experimental class of the C language the teacher should also require the students to prepare for the experiment. Because every time of the experiment course is only 90 minutes, the whole courses of the experiment are 16 period. At the same time, each experiment requires the students to complete several programming problem, the time is limited. If they do not preview, and wait until the experimental class to write the program, the students will complete some problems at least a class. Thus the students cannot complete the task of the experiment in the experimental class. Therefore we have to ask students to prepare, the students write the program before the experimental class, debug and improve the program in the experimental class. When the students encounter the problems that they do not understand or solve, the teacher will help to solve the problems. The teacher should not directly tell the answer to the students, he should guide the students how to modify the program so as to develop students' ability of debugging program. The reasons of the program error are two: ①The program compiles wrong. ② the logic of the program is error. The first kind of error, the teacher should tell the students how to correct the error by the output window that points the location and the reason of the error. The second kind of error, the teacher should guide the students to start by using the tool provided by the debug window, to check whether the data in the program is correct, and to correct the mistakes step by step.

In the course of learning C language, students often have a headache for the complex learning contents. Therefore the teachers should be more detailed in the teaching of theoretical knowledge, according to the students' accepting ability, introduce the teaching contents from simple to complex. As to the teaching difficulties, the teacher should use various teaching methods to make them easier for the students accepting, slow the lecture speed down, give the students more time to digest. In particular, the difficulties of the C language should be broken through one by one, and in the course of teaching the teacher should deepen the students' impressions many times.

Conclusions

The contents of the course of C language are very rich. The teacher only uses the good teaching methods, the students can grasp the good study method. Thus we believe that the students does not think the course difficult. At the same time, the teaching is a process that needs continuous improvement and perfection. The teacher should sum up the experience of the teaching and make the teaching of C language to a new level.

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