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METHODOLOGY OF TEACHING THE SUBJECT OF PARAMETER REPETITION OPERATOR
(In the example of the Python programming language)

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Abstract
The article describes the methods of teaching the parameterized repetition operator based on interactive methods in the teaching of programming languages using the example of the Python programming language.

Key words: generation Z, interactive methods, programming language, for operator, python.

Introduction
Today's generation of learners is called Generation Z. They are the generations of the digital age. Generation Z is dramatically different from previous generations in all respects. They are constantly developing and moving forward. This generation is also called "Vundirkin's generation". It is difficult to understand the teenagers of generation Z, but it is possible to work with them only if you understand how and with what these young people live [1].

When teaching programming languages to representatives of the Z generation, it is necessary to take into account that they constantly work with digital information and have the skills to use the opportunities of the global network and social networks. Representatives of this generation cannot be interested in traditional lessons. In order to widely involve them in the educational process, effective use of electronic boards, virtual stands and trainers, educational platforms, infographics, online tests and questionnaires is required.

Literature Analysis
There are many programming technologies and programming language learning tips available online today. But in the age of digital technologies, this knowledge quickly becomes obsolete and becomes unnecessary information. Among them, it is necessary to find and teach really relevant and useful material [2].

A lot of research has been done on teaching programming languages. Including:

- Zhemchuzhnikov Dmitry Grigorevich - developed a methodology for teaching programming based on the creation of dynamic computer games by schoolchildren [3];

Rozhina Irina Venokentevna - improved the methodology of teaching object-oriented programming and visual design technologies to students in the computer science course [4];

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- Darya Mikhailovna Grebneva conducted scientific research on teaching programming to schoolchildren based on the semiotic approach[5].

The Result

In order to solve the problems faced by the educational system in the innovative processes taking place at the present time, independent and free-thinking persons are needed who are able to absorb new information and evaluate the acquired knowledge by themselves, and make the necessary decisions.

That is why the role and importance of modern teaching methods, i.e. interactive methods, innovative technologies in the educational process of educational institutions is incomparable. Pedagogical technology and the knowledge and experience of their use in education ensure that students have knowledge and advanced skills [6].

Usually, interactive methods are organized in the form of individual, pair, group, team work. When explaining the repetition operator, it is necessary to first divide the students into two groups, and then create pairs within this group. One of the main difficulties with passing a parameterized iteration operator is that it has two parts. For example:

```
for i in range(5,12,2):
print(i*i-3)
```

When determining the result of this program sheet, it is necessary to first determine what values the parameter i will take. In the example above, it accepts the values 5,7,9,11. After that, the action to be performed corresponding to each value of the parameter is determined. That is, 5·5-3=22 is printed when i=5, 46 is printed when i=7, 78 is printed when i=9, and 118 is printed when i=11. To turn this thinking process into a skill, it works well to use the "live counter" method.

Discussion

Stage 1. Participants of both groups are divided into small groups of two. Members of the small group come to the board in turn. They choose from the cards with the following program sheets:

For Participant 1	For Participant 2
for i in range(5, 12, 2):	print(i * i - 3)
for i in range(9):	print(i + i * 2)
for i in range(13, 3, -2):	print(i - 10)
for i in range(2, 13):	print(6)
for i in range(8, 3):	print(i * 2, sep=':')
for i in range(7):	print(i ** (-1), sep=',', end='!')
for i in range(12, 3, -1):	print(i, sep='')

So, one of the participants chooses the handout with only the for operator, and the other chooses which code to print. They don't see the code in each other's distributions. For example, Participant 1

```
for i in range(5, 12, 2):
```

If he selects a program board in the form, he writes the following on the board:

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i	
5	
7	
9	
11	

The second participant should choose the following program for example:
print(i - 10) in which he fills in the blackboard based on the values of i written by participant 1 as follows:

i	print
5	-5
7	-3
9	-1
11	1

The rest of the participants of the group will have to write down what kind of handout is in the hand of both participants. The results of the first pair and the result of the group are evaluated (5 points for each correct answer of the participants of the pair, 5 points for the total answer of the group). Then the pair from the second group is invited to the blackboard. They perform the same tasks as above. In this way, the performance of all pairs is evaluated and the results of the 1st stage are announced and the second stage is passed.

In this process, students will learn the principle of operation of the for operator, and when they write the code based on the results written by other participants of the group, they will not only be able to analyze the finished program, but also have the ability to create an independent program based on the given data.

Step 2. The participants of both groups are divided into small groups of 3 people within their groups and are invited to the blackboard in turn. They are offered to choose one of three sets of handouts. for example:

For Participant 1	**For Participant 2**	**For Participant 3**
for i in range(5,7):	for j in range(3):	print(i+j)
for i in range(15,7,-3):	for j in range(6,9):	print(i-j)
for i in range(8,1,-3):	for j in range(10):	print('i')
for i in range(3):	for j in range(i):	print(j*i)
for i in range(5):	for j in range(i+1):	print(j-i)

If participants chose the following codes:
Participant 1: for i in range(5):
Participant 2: for j in range(i):
Participant 3: print(i-j)
They enter the following information on the board:

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i	j	print
0	-	-
1	0	1
2	0	2
	1	1
3	0	3
	1	2
	2	1
4	0	4
	1	3
	2	2
	3	1

After the small groups write the result based on the program sheets, the remaining participants of this group determine what program sheets are written in their hands. The results of the learners are evaluated and then the members of the small group in the group are invited to the blackboard. After all small groups have written their results based on the handout, the total scores will be announced.

At this stage, students get acquainted with the principle of operation of the nested parameter repetition operator and acquire the ability to analyze complex programs using them in practice.

After that, learners can be assigned to individual analysis of programs that are large in size and contain several nested cycles. It is appropriate to use modern advances in information technology. In particular, it is possible to organize group or individual online tests using platform options such as Kahoot.com or onlinetestpad.com.

CONCLUSION

It is difficult to form the thinking process typical of a programmer at once. Such an approach helps to form a mindset that serves to understand the parameterized iteration operator. When learning to program now, it's difficult to fully understand a script like the one below:

```
for i in range(15,10,-1):
for j in range(3,7):
print(i-j+3)
```

But it is possible to build complex programs and understand them by developing the thought process step by step.

References

1. Generation Z: what they read, how and why: according to the results of monitoring / GBUK "Crimean Republican Library for Youth"; comp. EAT. Tkachenko. - Simferopol, 2017. - 28s
2. How to learn programming? "become a professional programmer in the shortest possible time" - A. Kashevarov - 2013. - 88s

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3. Zhemchuzhnikov D. G. Programming teaching methodology based on the creation of dynamic computer games by schoolchildren: Abstract of the thesis. diss. doc. Ped. Sciences. - Moscow: 2013. - 25 p.
4. Rozhina I. V. Teaching students object-oriented programming and visual design technology in the basic course of computer science: Diss. candidate Ped. Sciences. - Moscow: 2002. - 175 p.
5. Grebneva D.M. Semiotic approach to teaching programming at school // Modern problems of science and education. - 2013. - No.
6. Innovative pedagogical technologies in education and training (educational system employees, methodologists. Study guide for teachers, educators and trainers) - T.:2013-279 p.