

Ideological and political teaching in Python Programming take turtle library drawing as an example

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Abstract: This paper takes the drawing of turtle Library in Python program design course as an example to design ideological and political teaching cases and cultivate students' ability of drawing inferences from one instance. It cultivates students' patriotic feelings and enhances their national pride by drawing five-pointed stars, five Olympic rings, five-star red flag, Bing Dwen Dwen and Shuey Rhon Rhon in the turtle library. and it carries forward Chinese traditional culture and cultivates students' enterprising quality by drawing Taiji diagram and sunflower. This case provides a reference for teachers to integrate ideological and political ideas into other courses, and also provides ideas for promoting ideological and political reform in colleges and universities.

1. Introduction

With the change of college teaching concept, teachers play a more leading role. Teachers need to constantly innovate teaching plans, learn in teaching, improve teaching ability, and cultivate students' ability to adapt to the development needs of the big data era. With the change of teaching methods, we will take students as the center, change the traditional teaching methods, make full use of online resources such as flipped classes and online MOOC, conduct online and offline mixed teaching, create an independent learning environment for students, and customize personalized learning plans for students.

According to the requirements of the guiding outline for ideological and political construction of college courses^[1], in the teaching process of Python programming courses, we combine the contents of the country and Chinese culture involved in the courses, refine the knowledge, humanity and epochal nature of the courses, tap the ideological and political resources of the courses, follow the method of gradual integration of ideological and political elements from simple to deep, and design ideological and political teaching cases according to the principle of task driving from easy to difficult. The task-driven method and case teaching method are used for practical teaching^[2].

Teachers use cases to drive the teaching of knowledge points, and truly let students apply what they have learned. The task-driven method and case teaching method used in teaching can stimulate students' interest in learning, guide students in thinking, make the transmission of ideological and political connotation in Python programming courses more profound and natural, and let students naturally accept education in patriotism, Chinese traditional culture, scientific ethics and responsibility, which is conducive to the natural realization of ideological and political education. At the same time, students' computer practice is an important part of Python courses, which can provide vivid examples for "practice is the only standard for testing truth". Only by participating in computer practice can students discover problems, trace the origin, verify problems and solve problems.

This paper takes the drawing of the turtle Library in the python program design course as an example to design the ideological and political teaching case and cultivate the students' ability to

draw inferences from one instance and positive energy quality. At the same time, it also provides reference for teachers to integrate ideological and political ideas into other courses, and also provides ideas for promoting ideological and political reform in Colleges and universities.

2. Academic situation analysis

Python program design is a public compulsory course for freshmen who are not computer majors. It is the core course in the basic computer teaching series. It lays a solid foundation for the learning of subsequent computer courses. The students come from different regions, and their foundations are uneven. Some students have poor abstract thinking ability.

3. Teaching design

In Python programming courses, there are many knowledge points that can be integrated into Ideological and political elements. Through the explanation and analysis of the development process of Python language, students can be inspired to study hard. By explaining the storage space occupation of different types of data, students are guided to save resources. In the teaching of circular structure, students are allowed to learn the craftsman spirit of "repetition and practice makes perfect". The modular program design of division of labor and cooperation is realized through functions, so that students can understand the importance of win-win cooperation. Through the call of time library, students are urged to cherish time and realize self-worth. By drawing five pointed stars, five Olympic rings, five-star red flag, Bing Dwen Dwen and Shuey Rhon Rhon in the turtle library, students can cultivate their patriotic feelings and enhance their national pride. By drawing Taiji map and sunflower, we can promote Chinese traditional culture and cultivate students' enterprising quality. Let's take the drawing of turtle library as an example for teaching design.

3.1. Key and difficult points in Teaching

Key points: basic graphics drawing of turtle library.

Difficulty points: using turtle library to draw complex graphics.

3.2. Teaching objectives

Master Python's built-in turtle library and draw various graphics. Through the study of turtle library, students' computer programming ability and computational thinking ability are cultivated. Cultivate students' ability to discover, analyze and solve problems. Through the drawing of five-star red flag, Tai Chi map and other patterns, students are guided to love the great motherland and the traditional culture of the motherland, and build patriotic feelings of the country in the future.

3.3. Teaching strategy

Ideological and political education stresses moistening things silently. In the course of teaching python programming, in addition to chatting with students about grammar, algorithms and technology inside and outside the classroom, they will also imperceptibly carry out ideological and political education of patriotism and love for Chinese traditional culture.

Python's turtle library is a very popular graphic drawing function library. The drawn graphics are intuitive, vivid and interesting, and it is easy to stimulate students' interest in learning. Turtle library teaching mainly uses task driven method and case explanation method, and follows the principle of setting task driven from simple to deep and from easy to difficult to design feasible ideological and political elements, and adds them to teaching examples to stimulate students' interest. Personalized learning tasks are arranged according to the different characteristics of students. For learners with different abilities, they are assigned tasks of different difficulty levels, such as drawing squares, pentagons, sunflowers, Bing Dwen Dwen, etc. Personalized learning tasks ensure that students can obtain a sense of learning achievement independently, improve students' learning interest and subjective initiative, and cultivate students' ideological accomplishment of being positive, patriotic

and loving the party in the teaching process. The specific contents of the turtle library and the integration points of Ideological and political elements are shown in Table 1.

Table 1 Integration point of Ideological and political elements of turtle library

Task description	infer other things	Value promotion of Ideological and political elements	Curriculum ideological and political implementation
Turtle library	Time Library,jieba library etc	In the field of software development, the best way to unite and cooperate is open source. Python software and third-party libraries such as the turtle Library in Python are open source. Software open source embodies the idea of "everyone for me, I for everyone", which greatly improves the efficiency of human work and promotes the progress of social civilization. Software workers should have a broad mind, be willing to contribute, unite and serve the people of the world.	Analysis and understanding, achieve mastery through a comprehensive study of the subject
Draw a square	Draw an n-sided shape	"The tree of embracing is born in the slightest; The nine storey platform starts from accumulating soil; "A journey of a thousand miles begins with a single step" comes from chapter 64 of Laozi by Li Er of Chu in the spring and Autumn period ^[3] . Help students establish the basic method of drawing in turtle library. Help students understand the current situation by drawing simple figures. As long as they keep practicing, mastering, drawing inferences from one instance, they will eventually achieve something.	Student practice: Draw quadrangle, Draw a Pentagon etc.
Draw triangle	Draw n angle	The five pointed star has the meaning of "victory". China's military ranks, national emblem and national flag all have the five pointed star logo. Learning to draw the five pointed star can cultivate the patriotic feelings of young people. Sunflowers symbolize brightness, enthusiasm and prosperity. Drawing sunflowers means the prosperity of the country, the prosperity of the country and the cultivation of students' enterprising quality.	Student practice: Draw five pointed star, Draw sunflowers etc
Draw a circle	Drawing the Olympic rings, Draw Bing Dwen Dwen, Draw Shuey Rhon Rhon	Drawing the Olympic rings, Bing Dwen Dwen and Shuey Rhon Rhon reminds college students of the difficulties of China's bid for the Olympic Games and the difficulties of national sports development. At the same time, they uphold the Olympic spirit of unity, friendship, justice and honesty. The success of the Olympic Games gives students a sense of national pride.	Student practice: Draw Tai Chi diagram, Draw the Olympic rings, Draw Bing Dwen Dwen etc

4. Teaching implementation

4.1. Course introduction

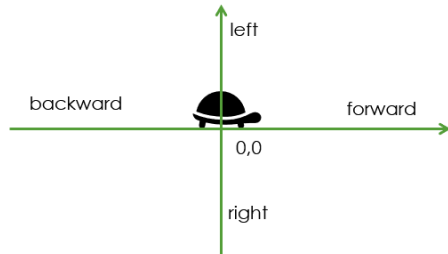


Figure 1 draw Bing Dwen Dwen by Python code.

Do you know the mascot above? This is drawn by the computer in Python programming language. Do you want to draw one yourself? OK, let's learn the basic knowledge of the turtle standard library for drawing Bing Dwen Dwen in Python.

4.2. Basic knowledge of turtle library drawing

The turtle library is one of the important standard libraries in Python. The function is to draw basic graphics. There is a basic framework for drawing graphics in turtle library, as shown in Figure 2. A small turtle crawls in the coordinate system, and its crawling trajectory forms the drawing graphics. There are three ways to reference the turtle library, as shown in Figure 3.



Turtle library

- There are **three ways** to import the Turtle library and call functions in the Turtle library
- No1:
 - import turtle
 - turtle.<function>()
- No2:
 - import turtle as t
 - t.<function>()
- No3:
 - from turtle import *
 - <function>()

Fig. 2 basic framework of turtle library. Fig. 3 three ways of importing turtle library.

The turtle library contains more than 100 function functions, which are divided into three types: form, brush state and brush motion. The form function `setup()` is used to set the size and position parameters of the main form. The brush state function is used to control the state of the brush, as shown in Fig. 4. The brush motion function controls the motion of the brush, as shown in Fig. 5. Students need to understand the name, parameters and uses of memory functions, and follow-up classroom demonstrations and students' practical exercises. In order to make the drawn graphics lifelike, the brush color of the turtle library drawing needs to be used, as shown in Figure 6.

function	example
<code>pendown(), pd(), down()</code>	
<code>penup(), pu(), up()</code>	
<code>penwidth(), width()</code>	<code>penwidth(1)</code> <code>penwidth(5)</code> <code>penwidth(60)</code>
<code>pencolor()</code>	<code>pencolor("red")</code> <code>pencolor("FF0000")</code> <code>pencolor(1,0,0)</code>
<code>fillcolor()</code>	<code>fillcolor("red")</code> <code>fillcolor("FF0000")</code> <code>fillcolor(1,0,0)</code>
<code>color()</code>	<code>color("red", "yellow")</code> <code>color("FF0000", "FFFF00")</code> <code>color(1,0,0,1,0)</code>
<code>begin_fill()</code>	
<code>end_fill()</code>	
<code>clear()</code>	
<code>reset()</code>	
<code>screenwidth()</code>	
<code>hideturtle(), ht()</code>	
<code>showturtle(), st()</code>	
<code>isvisible()</code>	
<code>write(str,font=None)</code>	<code>write("China",font="c:\font\script_20.ttf")</code>

function	example
<code>forward(), fd()</code>	<code>forward(100)</code> <code>fd(200)</code>
<code>backward(), bk()</code>	<code>backward(100)</code> <code>bk(200)</code>
<code>right(angle)</code>	<code>right(90)</code>
<code>left(angle)</code>	<code>left(30)</code>
<code>setheading(angle), seth()</code>	<code>setheading(45)</code> <code>seth(45)</code>
<code>goto(x,y)</code>	<code>goto(100,200)</code>
<code>setx()</code>	<code>setx(100)</code>
<code>sety()</code>	<code>sety(200)</code>
<code>home()</code>	<code>home()</code>
<code>circle(radius, steps=n)</code>	<code>circle(100)</code> <code>circle(100,90)</code> <code>circle(100,steps=6)</code>
<code>dot(color)</code>	<code>dot(10)</code> <code>dot(10, "red")</code>
<code>undo()</code>	<code>undo()</code>
<code>speed()</code>	<code>speed(1)</code> <code>speed(10)</code>

Fig. 4 brush state function of the turtle library. Fig. 5 brush motion function of the turtle library.

4.3. Case explanation and demonstration

The explanation of drawing a straight line in case 1 starts from drawing a square → for loop → n-shaped; Sunflower → n-angled star → pentagram, etc., as shown in Figure 6. The explanation idea of drawing an arc in case 2 is from n-shaped → circle drawing a circle → semicircle → arc → Taiji diagram → 30 circles, etc., as shown in Figure 7.

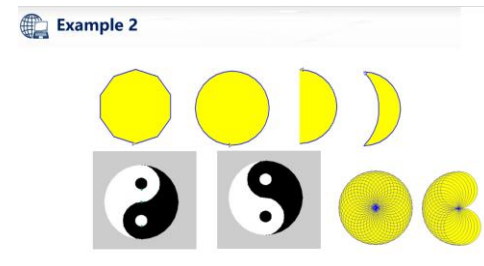
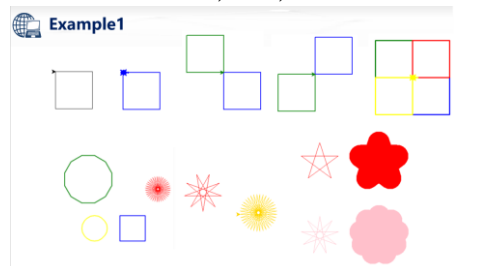


Fig. 6 example 1 explains the figure drawn. Fig. 7 example 2 explains the figure drawn.

The programming code of different functions of the turtle library used in the Taiji diagram implementation in example is shown in Figure 8.

Figure 8 programming code of Taiji diagram implementation.

4.4. Classroom exercises

Students practice the contents of case 1 and case 2 in class. Some works of students' classroom exercises are shown in Figure 9.

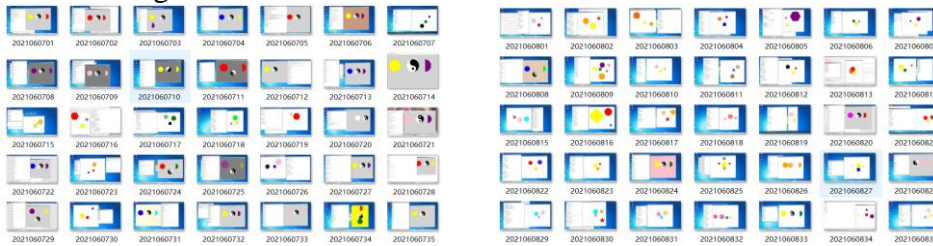


Figure 9 students' exercises in class.

Class summary: figures are composed of straight lines or arcs. Students, if you combine the case 1 of drawing a straight line with the case 2 of drawing an arc, can you draw any figure? The teacher demonstrated the case by drawing inferences from one instance, as shown in Figure 10. And analyze how the case is drawn? Which straight lines or arcs are the graphics composed of? Which functions are used to implement them?

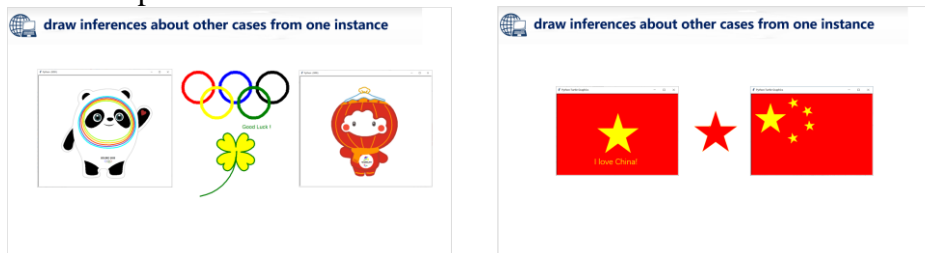


Figure 10 case study.

4.5. Homework after class

Any figure is composed of straight lines or arcs. After class, students can draw a complex figure by drawing comprehensive drawing assignments in combination with case 1 of drawing straight lines and case 2 of drawing arcs. The next computer practice class will be a flipped class. Students will be selected voluntarily or randomly to show the drawn graphics on the platform and explain the logic of the drawing code. Students who participate in the class explanation will be given extra points for their usual grades.

Some of the works of students' homework are shown in Figure 11.



Figure 11 students' homework.

Part of the code is shown in Figure 12.

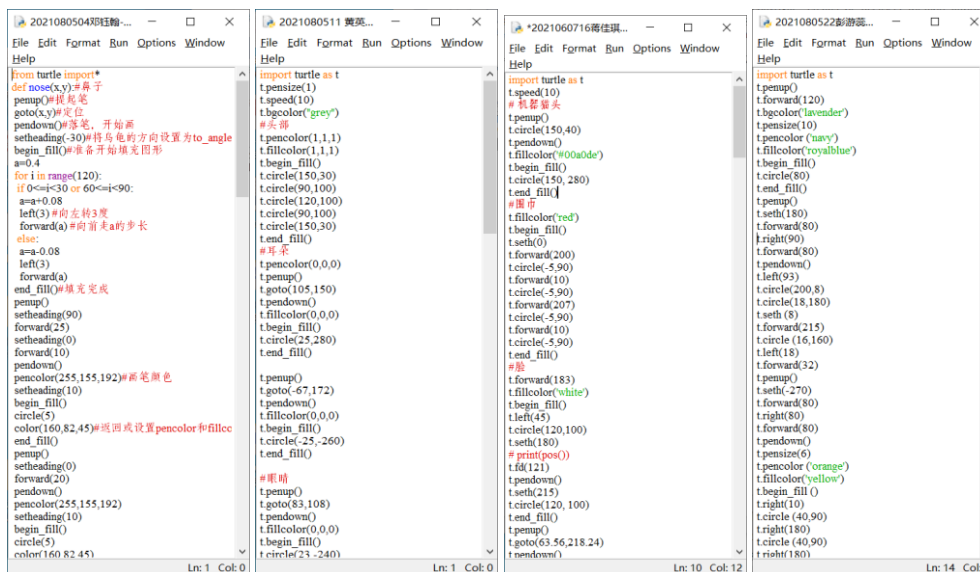


Figure 12 Code of students' homework.

4.6. Formative evaluation

Through students' computer practice and works display and explanation in flipped class, students' learning interest and enthusiasm are fully mobilized. Through learning and applying the basic knowledge of the turtle Library in Python, students have made many good works, and each student's works are infinitely creative.

4.7. Teaching reflection

Each student's works are different, with obvious personalized characteristics and unlimited creativity. In order to make better works, some students have self-taught a lot of in-depth content by searching for materials, which has improved their learning initiative, enthusiasm and self-learning ability.

5. Conclusion

Through the drawing case of the turtle Library in Python programming, we can design the content difficulty and draw rich meaning graphics step by step, so that students can gradually master the difficult turtle library content in a relaxed and happy way. This can not only stimulate students' enthusiasm for learning, but also enable students to think positively, learn actively, and achieve the deep integration of knowledge and skills. Through the teaching of intuitionistic and vivid drawing graphics, it is beneficial to break through the teaching difficulties and complete the training of students' thinking ability in programming from concrete to abstract.

Through the practice of drawing Bing Dwen Dwen, Wuhuan and Taiji diagrams in the teaching process of program design, the teaching requirements of the course are completed. At the same time, in the teaching process, students' patriotic feelings are imperceptibly cultivated, students' national pride is enhanced, and Chinese traditional culture is carried forward.

References

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