

Research on the Case Study of Computer Programming Teaching

Xiaoxia Wan¹, Guomin Wu²(Corresponding author)

1. Yancheng Teachers University, Jiangsu, Yancheng, 224002

2. Yancheng Institute of Technology, Jiangsu, Yancheng, 224051

Abstract: Nowadays, with computer software playing an important role in our daily life, computer programming is growing in popularity. Typically, different students learn computer programs at different levels, including beginner, intermediate and advanced. For the beginner, grammar is paid more attention in order that students can understand computer language. As to the kind of student with intermediate level, algorithm and data structure are key points for teaching computer programming. For the advanced learner, more mathematical model is constructed to solve particular problem, which is based on the computer programming.

Keywords: Computer Language; Python; C++; Case Study

Introduction

With the development of information technology, computer programming has been drawn much attention from academia and industrial circle^[1]. These programme on the operating platform can provide different convenience for people in our daily life, such as intelligent searching, and so on. As usual, these respective teaching process of case study can be finished for different learners with these following different levels.

1. Analysis of Teaching of Case Study for Elementary Learner

Herein, the first example is shown for different names and ages in the class artist. Moreover, corresponding teaching analysis of Python language for elementary learner is presented in the following, which aims to teach some key points of object-oriented programming^[2].

```
class artist:
    name = ""
    age = 0
    def st(self,studname,studage):
        artist.name = studname
        artist.age = studage
    def display(self):
        print("programming is an art")
        print("His name is ",end="")
        print(self.name)
        print("His age is",end="")
        print(self.age)
        print("-----")
def main():
    student1 = artist()
    student2 = artist()
    student1.st("nike",11)
    student1.display()
    student2.st("glair",12)
    student2.display()
if __name__ == '__main__':
    main()
```

In the example mentioned above, there are two objects defined in the main method, student1 and student2. Among class artists, two attributes are defined, namely name and age. Two public methods, st() and display() are also defined to set object properties and display object information. When run, the names and ages of the two objects are displayed. Based on the example, elementary

learners can obtain the knowledge about class definitions, object generation and others. In general, this kind of learner can attain some knowledge of grammar to understand the programme .

2. Analysis of Teaching of Case Study for Intermediate Learner

In the following example, corresponding brackets is required to be matched in the whole string^[3]. Herein, the corresponding teaching analysis of C++ language for intermediate learner is presented as follows, which aims to teach some core points in the data structure and related algorithm.

```

#include<bits/stdc++.h>
using namespace std;
string a;
bool check(){
    int t=0;
    for(int i=0;i<a.length()-1;i++){
        if(a[i]=='(') t++;
        if(a[i]==')'){
            if(t>0)t--;
            else return false;
        } if(t!=0) return false;
    }
    for(int i=0; i<a.length()-1;i++) {
        if(i==0&&a[i]=='-')
            a='0'+a;
        else if(a[i]=='-'&&a[i-1]=='(')
            a.insert(i,"0");
    }
    for(int i=0;i<a.length()-1;i++) {
        if(!(a[i]>='0'&&a[i]<='9')&&!(a[i+1]>='0'&&a[i+1]<='9'))
        {
            if(a[i]=='-')&&a[i+1]=='(')return false;
            else if(!(a[i]=='-')||a[i+1]=='('))
                return false;
        }
    }
    return true;
}
void clac(){
    map<char, int> p;    p['+']=p['-']=1;
    p['*']=p['/']=2;    p['(']=0;
    queue<char> h;    stack<char> f;
    for(int i=0;i<a.length()-1;i++) {
        if(a[i]>='0'&&a[i]<='9'){
            h.push(a[i]);
            if(!(a[i+1]>='0'&&a[i+1]<='9'))
                h.push(' ');
        }
        else if(a[i]=='(') f.push(a[i]);
        else if(a[i]==')'){
            while(f.top()!='('){
                h.push(f.top()); f.pop();
            }
            f.pop();
        }
        else if(a[i]=='+'||a[i]=='-'){
            char b=h.front();    h.pop();
            int c=0,d=0;    int sum=0;
            if(b=='-'){
                s.push(t);    t=0;
            }
            else if(b>='0'&&b<='9') t=t*10+int(b-'0');
            else{
                d=s.top();    s.pop();
                c=s.top();    s.pop();
                if(b=='+')sum=c+d;
                else if(b=='-')sum=c-d;
                else if(b=='*')sum=c*d;
                else sum=c/d;    s.push(sum);
            }
        }
        cout<<s.top();
    }
}

```

In the above example, here the main function is omitted. When the program runs, if you enter the correct expression, the correct calculation result will be displayed. For example, if you enter “3*(8-5)=” on the keyboard, and then enter “Enter”, the calculation result 9 will be displayed on the screen, indicating that the left parentheses and the right parentheses matched. If the left parentheses and the right parentheses in the input expression do not match, “No” is displayed. For example, if you enter “4*(5+3=)” on the keyboard and press Enter, “No” is displayed.

Here, learners use the relevant algorithm of the stack to achieve this function, the function push() represents push on to the stack, the function pop() represents pull data from the stack. The characteristics of the stack is Last- In First-Out(LIFO).

The knowledge involved in the program belongs to the knowledge and application of the stack in the data structure and algorithm. Intermediate programmers can further use the algorithm to solve practical application problems after mastering the basic syntax and

process of programming.

3. Analysis of Teaching of Case Study for Advanced Learner

In the last example, this intelligent program can accomplish the following function. The oldest ancestor can be found on condition that the necessary relation between parent and kid is provided^[3]. Here, the corresponding teaching analysis of C++ language for advanced learners is shown as follows, which aims to teach some core points and corresponding algorithms.

```
#include<bits/stdc++.h>
using namespace std;
int sum=0,i,j,s=1,questions[100],question=0;
char x,n[6];
struct a{
    int ancestor; char name[6];
}genealogy[5001];
int find(int x){
    while(genealogy[x].ancestor!=x)
x=genealogy[x].ancestor;
    return x;
}
void unionn(int x,int y) {
    x=find(x); y=find(y);
    genealogy[y].ancestor=x;
}

int who(){
    int len,ss; cin>>n; len=strlen(n);
    for(i=1;i<=sum;i++){
        ss=1;
        for(j=0;j<len;j++){
            if(n[j]!=genealogy[i].
name[j]){
                ss=0; break;}
        }
        if(ss)return i;
    }
    sum++;genealogy[sum].ancestor=sum;
    for(i=0;i<len;i++)
        genealogy[sum].name[i]=n[i];
    return sum;
}
```

After creating the family tree, the program uses the corresponding search algorithm to find the oldest ancestor of the specified person, that is, the root node in the family tree. Firstly, mathematical theory is used to model the problem. Then, the corresponding search algorithm is designed. Finally, write a program to realize the algorithm function. This is often used by advanced learners in programming implementation problems.

References:

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Acknowledge:

We specially thank Yumin Hou from Yancheng Jingshan middle school, Yuxuan Dai from Wenzhou Baotian middle school for their work in the functional implementation and others.