

Weekly Report Jul,8-Jul,14,2018

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Abstract

In the past one week ,I furthered my study on C++,(object-oriented programming), together with computer system. Meanwhile, I started the lesson of Algorithm.

1 Current State

- 1 Finished exercise1 of (Learn the Python the Hard Way)
- 2 Started week one of ALGORITHM on coursera by Stanford,
- 3 Roughly grasped the core concept of object-oriented programming .

2 Knowledge learned in the past two weeks

2.1 Algorithm

2.1.1 Karatsuba multiplication

- 1 karatsuba multiplication is a recursive multiplication with the time complexity of $3n \log n$, which is rather faster than the traditional multiplication with the time complexity of n^2 . The core approach of the multiplication is to divide the multipliers into 2 parts recursively. For an example:
- 2 Let us take X and Y as two multipliers
- 3 Step 1 divide X into a and b from its middle, do the same to Y into c and d
- 4 Step 2 use a multiply c, use b multiply d
- 5 Step 3 use $(a + b)$ multiply $(c + d)$
- 6 $(ad + bc)$ can be calculated by multiplying $(a+b)$ with $(c + d)$ and then do a simple subtraction, do the multiplication in a recursive way until a is a single digit number

2.1.2 Merge sorting

- 1 The Merge sorting itself is also a recursive algorithm, which divides an array from the right middle into two arrays and sort them up from the very first element till the end. If we repeat this operation in a recursive way ,we will finally get the answer with an average of time complexity of

054 $n \log n$, which is rather faster than the normal ways(n^2). For an example:
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056 2 we sort an array X
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058 3 we take C as the output ,A as the left sorted array, B as the right one , $i=j+1$, (recording times), and
059 then we sort the two arrays from their very beginnings. t
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062 **2.2 object-oriented programming**
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064 1 I furthered my study of C++ last week by learning about the usage of pure virtual functions as
065 well as the class inheritance and did quite a few programming in this field.
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068 **3 Questions**
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070 1 I started Algorithm this week and was really attracted to the fantastic magic-like operations, but
071 if I don't know if my basic knowledge is enough for the further learning , I need some piece of
072 advice. (Whether I should learn other curricula at first)
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075 **4 Plan for the Next Week**
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077 1 Keep learning the Algorithm.
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079 2 Continue my learning on computer system with language C.
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081 3 Continue my practice of object-oriented programming.
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