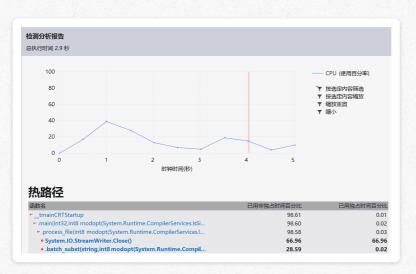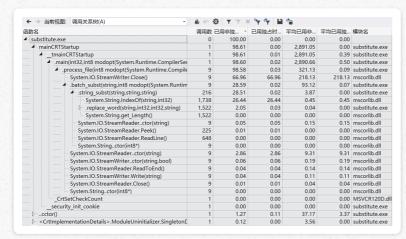# 系统程序设计作业Unit5

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1.原程序

在visual studio 2013下，采用分析工具来运行程序，分析报告为下图所示

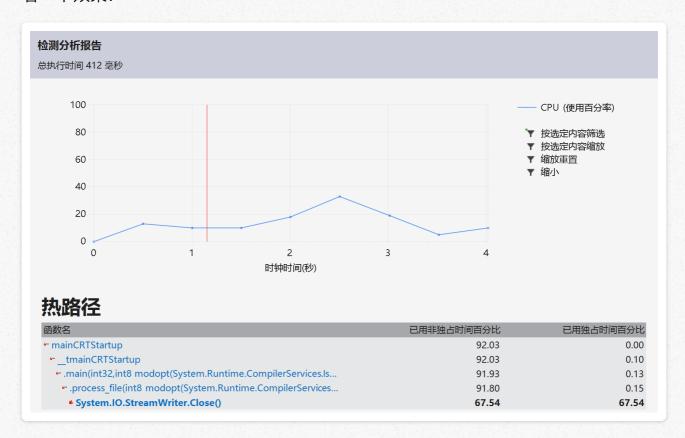
从上面一张图看出来：

- `System.IO.StreamWriter.Close()`这个函数非常耗时
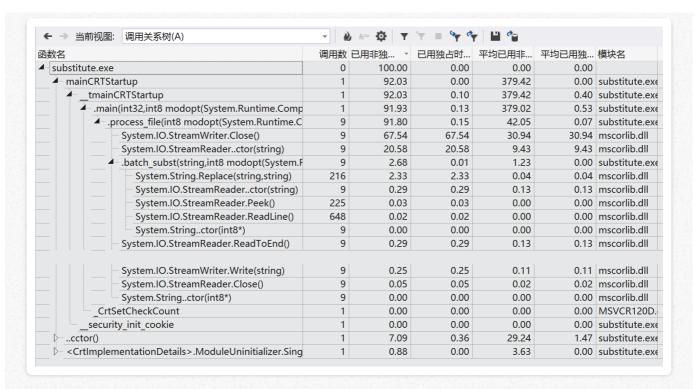- 匹配替换字符串的调用次数过多

2.改进

我做的改进就是不用自带的那个替换方法，而是使用 `String.Replace()`

```cpp
String* batch_subst(String *data, const char* subs_filename) {
    try {
        String *subs_file = new String(subs_filename);
        StreamReader *subs_reader = new StreamReader(subs_file);
        String *pattern, *replacement, *separator;
        while (subs_reader->Peek() >= 0) {
            pattern = subs_reader->ReadLine();
            replacement = subs_reader->ReadLine();
            separator = subs_reader->ReadLine();
            //data = string_subst(data, pattern, replacement);
            data = data -> Replace(pattern, replacement);
        }
        return data;
    } catch(Exception* e ) {
        Console::WriteLine( "Error in do_substitutions ");
        Console::WriteLine( e->ToString());
        return data;
    }
}
```

看一下效果：

检测分析报告

总执行时间 412 毫秒

热路径

函数名	已用非独占时间百分比	已用独占时间百分比
mainCRTStartup	92.03	0.00
__tmainCRTStartup	92.03	0.10
.main(int32,int8 modopt(System.Runtime.CompilerServices.Is...	91.93	0.13
.process_file(int8 modopt(System.Runtime.CompilerServices...	91.80	0.15
System.IO.StreamWriter.Close()	**67.54**	**67.54**

函数名	调用数	已用非独...	已用独占时...	平均已用非...	平均已用独...	模块名
substitute.exe	0	100.00	0.00	0.00	0.00	
mainCRTStartup	1	92.03	0.00	379.42	0.00	substitute.exe
__tmainCRTStartup	1	92.03	0.10	379.42	0.40	substitute.exe
.main(int32,int8 modopt(System.Runtime.Comp	1	91.93	0.13	379.02	0.53	substitute.exe
.process_file(int8 modopt(System.Runtime.C	9	91.80	0.15	42.05	0.07	substitute.exe
System.IO.StreamWriter.Close()	9	67.54	67.54	30.94	30.94	mscorlib.dll
System.IO.StreamReader..ctor(string)	9	20.58	20.58	9.43	9.43	mscorlib.dll
.batch_subst(string,int8 modopt(System.F	9	2.68	0.01	1.23	0.00	substitute.exe
System.String.Replace(string,string)	216	2.33	2.33	0.04	0.04	mscorlib.dll
System.IO.StreamReader..ctor(string)	9	0.29	0.29	0.13	0.13	mscorlib.dll
System.IO.StreamReader.Peek()	225	0.03	0.03	0.00	0.00	mscorlib.dll
System.IO.StreamReader.ReadLine()	648	0.02	0.02	0.00	0.00	mscorlib.dll
System.String..ctor(int8*)	9	0.00	0.00	0.00	0.00	mscorlib.dll
System.IO.StreamReader.ReadToEnd()	9	0.29	0.29	0.13	0.13	mscorlib.dll
System.IO.StreamWriter.Write(string)	9	0.25	0.25	0.11	0.11	mscorlib.dll
System.IO.StreamReader.Close()	9	0.05	0.05	0.02	0.02	mscorlib.dll
System.String..ctor(int8*)	9	0.00	0.00	0.00	0.00	mscorlib.dll
_CrtSetCheckCount	1	0.00	0.00	0.00	0.00	MSVCR120D.
__security_init_cookie	1	0.00	0.00	0.00	0.00	substitute.exe
..cctor()	1	7.09	0.36	29.24	1.47	substitute.exe
<CrtImplementationDetails>.ModuleUninitializer.Sing	1	0.88	0.00	3.63	0.00	substitute.exe

速度提高了$(2.9/0.412 = 7.03)$倍；性能提升相当明显。