In the name of God

Project 4 — Parallel Programming Course

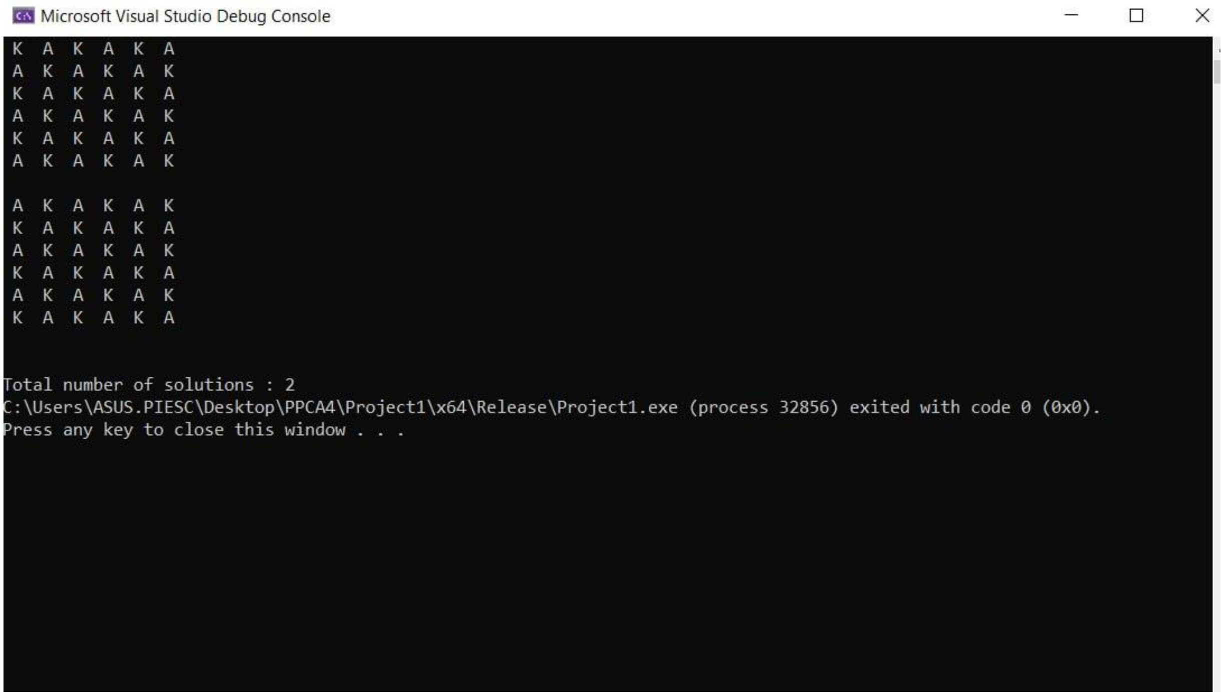
Instructor: **Dr. Safari**

Students:

Mohamad Yahyapour

Mohammad Moien Joneidi Jaafari

Part 1



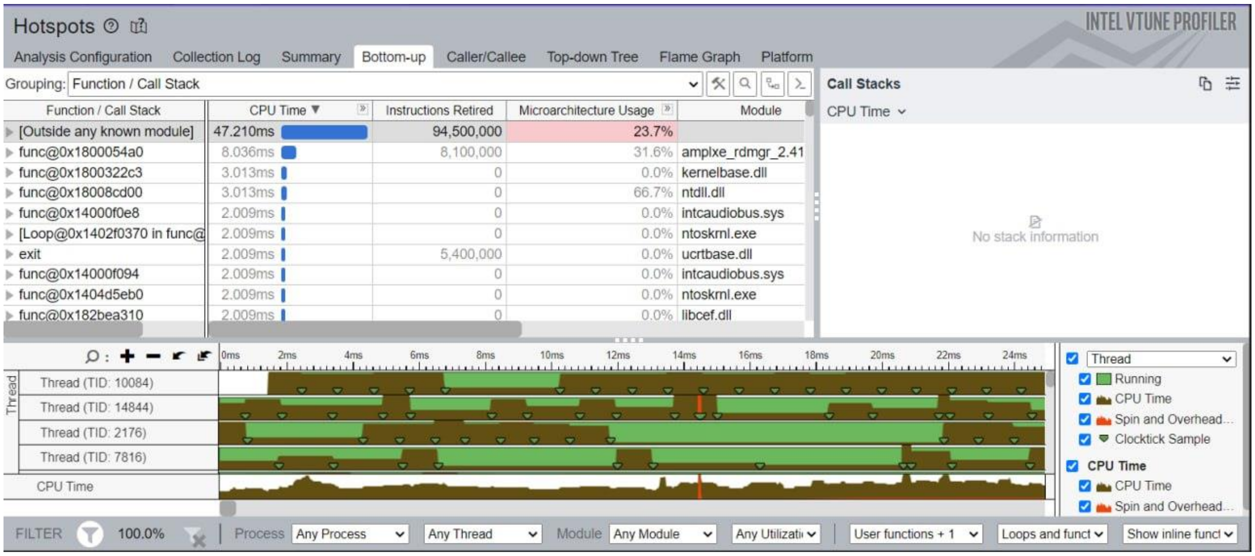
```
 K  A  K  A  K  A
 A  K  A  K  A  K
 K  A  K  A  K  A
 A  K  A  K  A  K
 K  A  K  A  K  A
 A  K  A  K  A  K

 A  K  A  K  A  K
 K  A  K  A  K  A
 A  K  A  K  A  K
 K  A  K  A  K  A
 A  K  A  K  A  K
 K  A  K  A  K  A


Total number of solutions : 2
C:\Users\ASUS.PIESC\Desktop\PPCA4\Project1\x64\Release\Project1.exe (process 32856) exited with code 0 (0x0).
Press any key to close this window . . .
```

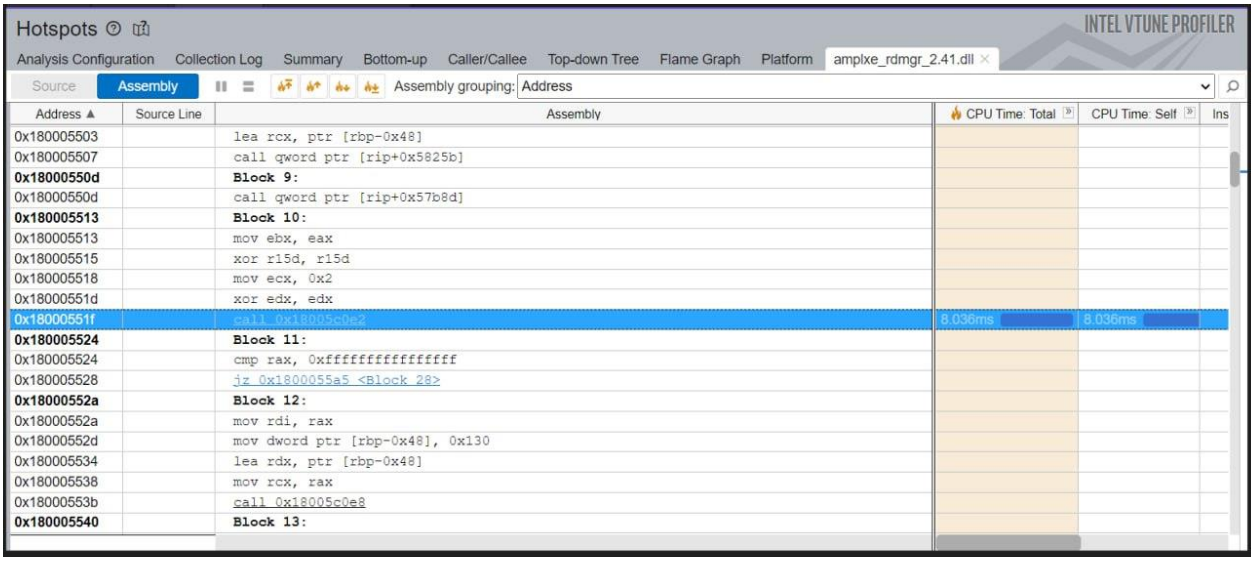
Execution of the serial program.

Step 1: Analyze the Serial Program



Grouping: Function / Call Stack

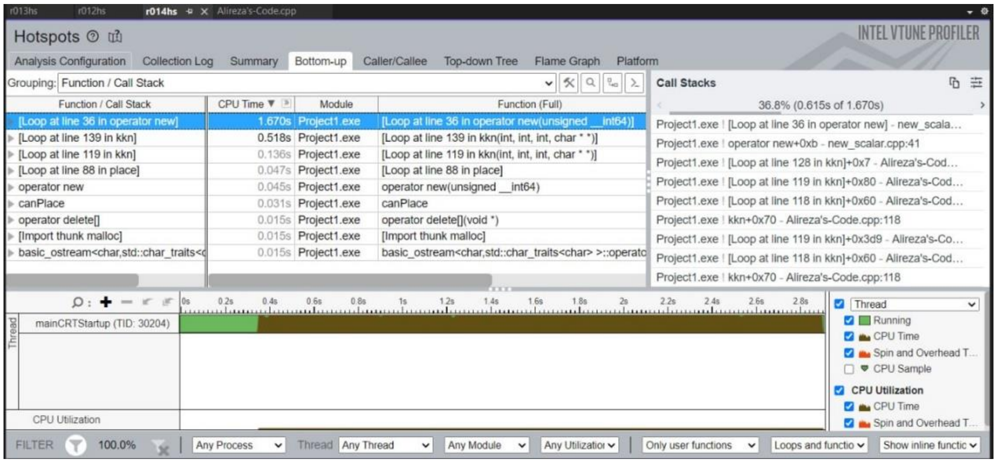
Function / Call Stack	CPU Time ▼	Instructions Retired	Microarchitecture Usage	Module
[Outside any known module]	47.210ms	94,500,000	23.7%	
func@0x1800054a0	8.036ms	8,100,000	31.6%	amplxe_rdmgr_2.41
func@0x1800322c3	3.013ms	0	0.0%	kernelbase.dll
func@0x18008cd00	3.013ms	0	66.7%	ntdll.dll
func@0x14000f0e8	2.009ms	0	0.0%	intcaudiobus.sys
[Loop@0x1402f0370 in func@	2.009ms	0	0.0%	ntoskrnl.exe
exit	2.009ms	5,400,000	0.0%	ucrtbase.dll
func@0x14000f094	2.009ms	0	0.0%	intcaudiobus.sys
func@0x1404d5eb0	2.009ms	0	0.0%	ntoskrnl.exe
func@0x182bea310	2.009ms	0	0.0%	libcef.dll



Assembly grouping: Address

Address ▲	Source Line	Assembly	CPU Time: Total	CPU Time: Self	Ins
0x180005503		lea rcx, ptr [rbp-0x48]			
0x180005507		call qword ptr [rip+0x5825b]			
0x18000550d		**Block 9:**			
0x18000550d		call qword ptr [rip+0x57b8d]			
0x180005513		**Block 10:**			
0x180005513		mov ebx, eax			
0x180005515		xor r15d, r15d			
0x180005518		mov ecx, 0x2			
0x18000551d		xor edx, edx			
0x18000551f		call 0x18005c0e2	8.036ms	8.036ms	
0x180005524		**Block 11:**			
0x180005524		cmp rax, 0xffffffffffffffff			
0x180005528		jz 0x1800055a5 <Block 28>			
0x18000552a		**Block 12:**			
0x18000552a		mov rdi, rax			
0x18000552d		mov dword ptr [rbp-0x48], 0x130			
0x180005534		lea rdx, ptr [rbp-0x48]			
0x180005538		mov rcx, rax			
0x18000553b		call 0x18005c0e8			
0x180005540		**Block 13:**			

Step 2: Implement Parallelism using OpenMP



Grouping: Function / Call Stack

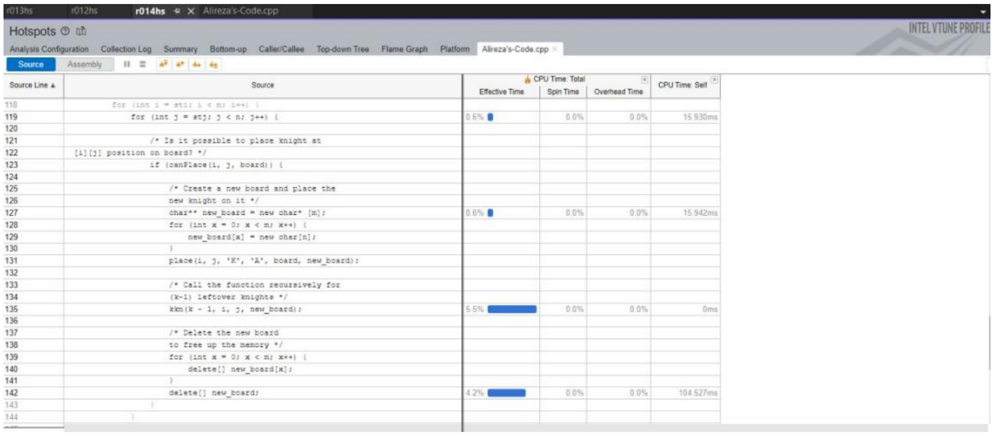
Function / Call Stack	CPU Time ▼	Module	Function (Full)
[Loop at line 36 in operator new]	1.670s	Project1.exe	[Loop at line 36 in operator new(unsigned __int64)]
[Loop at line 139 in kkn]	0.518s	Project1.exe	[Loop at line 139 in kkn(int, int, int, char * *)]
[Loop at line 119 in kkn]	0.136s	Project1.exe	[Loop at line 119 in kkn(int, int, int, char * *)]
[Loop at line 88 in place]	0.047s	Project1.exe	[Loop at line 88 in place]
operator new	0.045s	Project1.exe	operator new(unsigned __int64)
canPlace	0.031s	Project1.exe	canPlace
operator delete[]	0.015s	Project1.exe	operator delete[](void *)
[Import thunk malloc]	0.015s	Project1.exe	[Import thunk malloc]
basic_ostream<char,std::char_traits<c	0.015s	Project1.exe	basic_ostream<char,std::char_traits<char> >::operatc

Call Stacks

36.8% (0.615s of 1.670s)

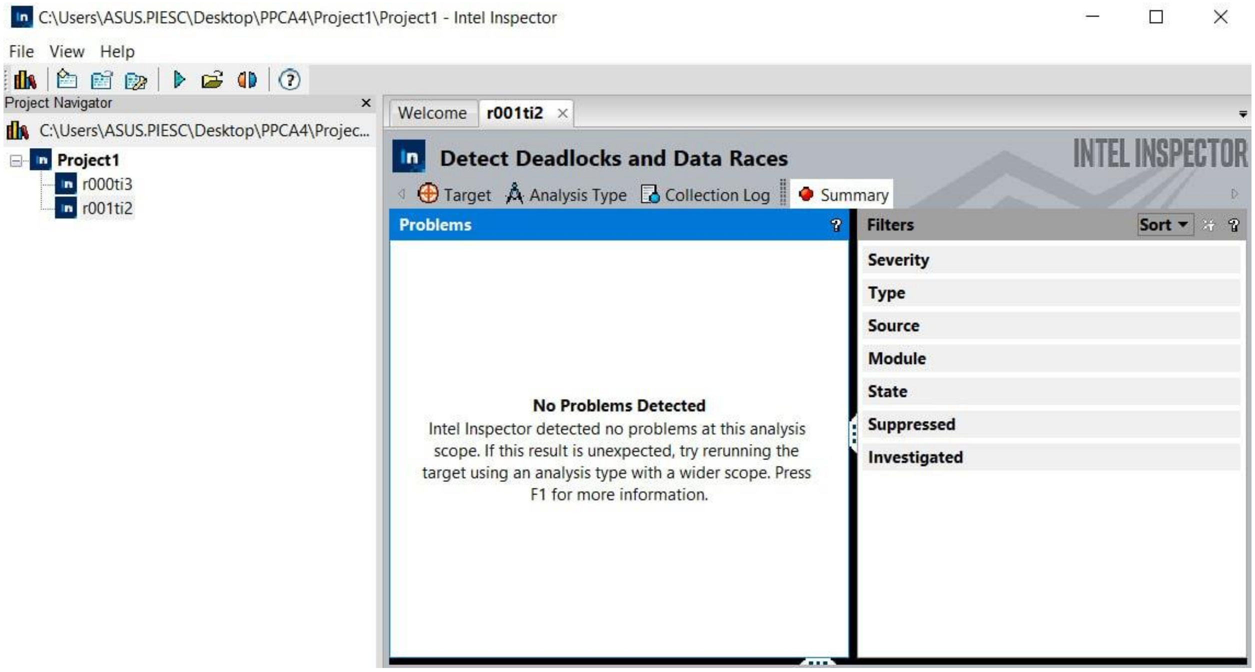
```
Project1.exe ! [Loop at line 36 in operator new] - new_scala...
Project1.exe ! operator new+0xb - new_scalar.cpp:41
Project1.exe ! [Loop at line 128 in kkn]+0x7 - Alireza's-Cod...
Project1.exe ! [Loop at line 119 in kkn]+0x80 - Alireza's-Cod...
Project1.exe ! [Loop at line 118 in kkn]+0x60 - Alireza's-Cod...
Project1.exe ! kkn+0x70 - Alireza's-Code.cpp:118
Project1.exe ! [Loop at line 119 in kkn]+0x3d9 - Alireza's-Co...
Project1.exe ! [Loop at line 118 in kkn]+0x60 - Alireza's-Cod...
Project1.exe ! kkn+0x70 - Alireza's-Code.cpp:118
```

FILTER 100.0% | Any Process | Thread Any Thread | Any Module | Any Utilizatior | Only user functions | Loops and functio | Show inline functic



Source Line ▲	Source	CPU Time: Total Effective Time	 Spin Time	 Overhead Time	CPU Time: Self
118	`        for (int i = sti; i < m; i++) {`				
119	`            for (int j = stj; j < n; j++) {`	0.6%	0.0%	0.0%	15.930ms
120					
121	`                /* Is it possible to place knight at`				
122	`[i][j] position on board? */`				
123	`                if (canPlace(i, j, board)) {`				
124					
125	`                    /* Create a new board and place the`				
126	`                    new knight on it */`				
127	`                    char** new_board = new char* [m];`	0.6%	0.0%	0.0%	15.942ms
128	`                    for (int x = 0; x < m; x++) {`				
129	`                        new_board[x] = new char[n];`				
130	`                    }`				
131	`                    place(i, j, 'K', 'A', board, new_board);`				
132					
133	`                    /* Call the function recursively for`				
134	`                    (k-1) leftover knights */`				
135	`                    kkn(k - 1, i, j, new_board);`	5.5%	0.0%	0.0%	0ms
136					
137	`                    /* Delete the new board`				
138	`                    to free up the memory */`				
139	`                    for (int x = 0; x < m; x++) {`				
140	`                        delete[] new_board[x];`				
141	`                    }`				
142	`                    delete[] new_board;`	4.2%	0.0%	0.0%	104.527ms
143	`                }`				
144	`            }`				

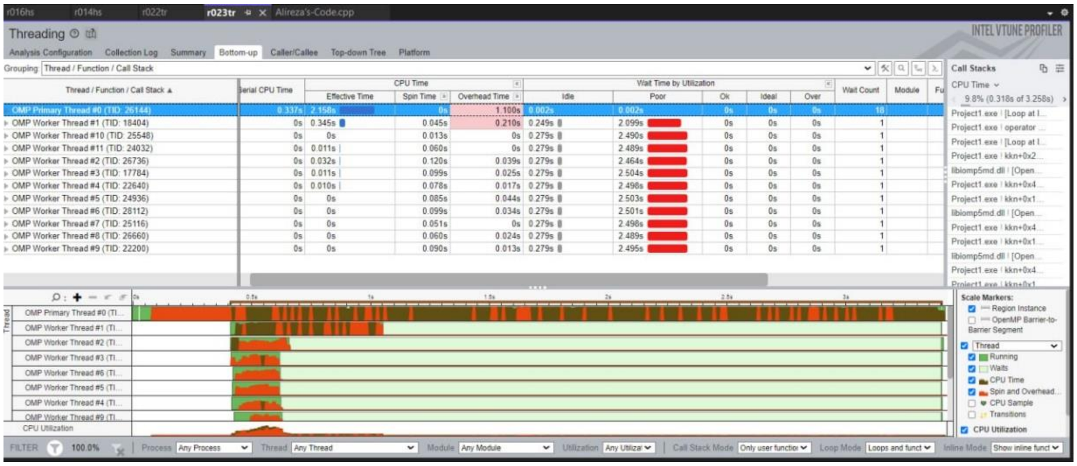
Step 3: Debug and Check for Errors



No Problems Detected

Intel Inspector detected no problems at this analysis scope. If this result is unexpected, try rerunning the target using an analysis type with a wider scope. Press F1 for more information.

Step 4: Tune the OpenMP program



Grouping: Thread / Function / Call Stack

Thread / Function / Call Stack	Serial CPU Time	CPU Time			Wait Time by Utilization					Wait Count	Module
		Effective Time	Spin Time	Overhead Time	Idle	Poor	Ok	Ideal	Over		
OMP Primary Thread #0 (TID: 26144)	0.337s	2.158s	0s	1.100s	0.002s	0.002s	0s	0s	0s	18	
OMP Worker Thread #1 (TID: 18404)	0s	0.345s	0.045s	0.210s	0.249s	2.099s	0s	0s	0s	1	
OMP Worker Thread #10 (TID: 25548)	0s	0s	0.013s	0s	0.279s	2.490s	0s	0s	0s	1	
OMP Worker Thread #11 (TID: 24032)	0s	0.011s	0.060s	0s	0.279s	2.489s	0s	0s	0s	1	
OMP Worker Thread #2 (TID: 26736)	0s	0.032s	0.120s	0.039s	0.279s	2.464s	0s	0s	0s	1	
OMP Worker Thread #3 (TID: 17784)	0s	0.011s	0.099s	0.025s	0.279s	2.504s	0s	0s	0s	1	
OMP Worker Thread #4 (TID: 22640)	0s	0.010s	0.078s	0.017s	0.279s	2.498s	0s	0s	0s	1	
OMP Worker Thread #5 (TID: 24936)	0s	0s	0.085s	0.044s	0.279s	2.503s	0s	0s	0s	1	
OMP Worker Thread #6 (TID: 28112)	0s	0s	0.099s	0.034s	0.279s	2.501s	0s	0s	0s	1	
OMP Worker Thread #7 (TID: 25116)	0s	0s	0.051s	0s	0.279s	2.498s	0s	0s	0s	1	
OMP Worker Thread #8 (TID: 26660)	0s	0s	0.060s	0.024s	0.279s	2.489s	0s	0s	0s	1	
OMP Worker Thread #9 (TID: 22200)	0s	0s	0.090s	0.013s	0.279s	2.495s	0s	0s	0s	1	

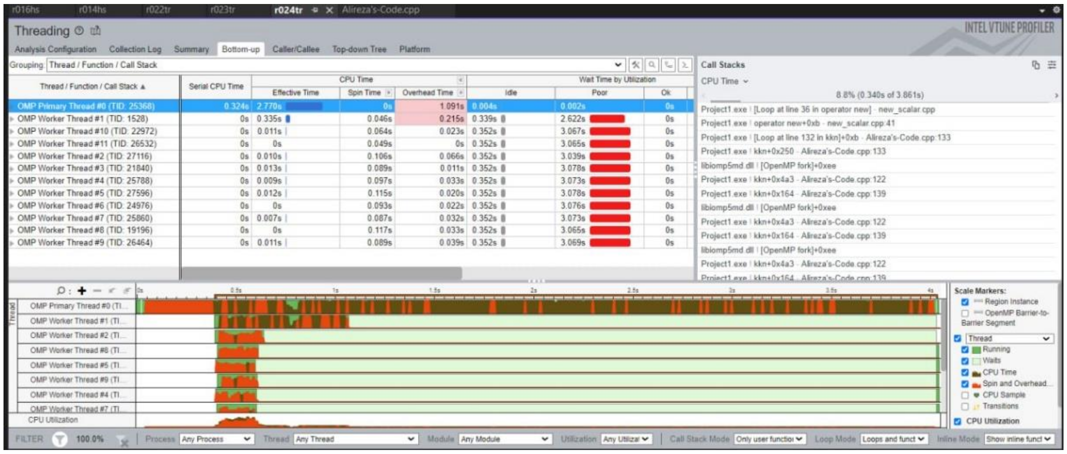
Call Stacks

CPU Time

9.8% (0.318s of 3.258s)

```
Project1.exe ! [Loop at l...
Project1.exe ! operator ...
Project1.exe ! [Loop at l...
Project1.exe ! kkn+0x2...
libiomp5md.dll ! [Open...
Project1.exe ! kkn+0x4...
Project1.exe ! kkn+0x1...
libiomp5md.dll ! [Open...
Project1.exe ! kkn+0x4...
Project1.exe ! kkn+0x1...
libiomp5md.dll ! [Open...
Project1.exe ! kkn+0x4...
Project1.exe ! kkn+0x1...
```

Process: Any Process | Thread: Any Thread | Module: Any Module | Utilization: Any Utilizat | Call Stack Mode: Only user functio | Loop Mode: Loops and funct | Inline Mode: Show inline funct



Grouping: Thread / Function / Call Stack

Thread / Function / Call Stack	Serial CPU Time	CPU Time			Wait Time by Utilization		
		Effective Time	Spin Time	Overhead Time	Idle	Poor	Ok
OMP Primary Thread #0 (TID: 25368)	0.324s	2.770s	0s	1.091s	0.004s	0.002s	0s
OMP Worker Thread #1 (TID: 1528)	0s	0.335s	0.046s	0.215s	0.339s	2.622s	0s
OMP Worker Thread #10 (TID: 22972)	0s	0.011s	0.064s	0.023s	0.352s	3.067s	0s
OMP Worker Thread #11 (TID: 26532)	0s	0s	0.049s	0s	0.352s	3.065s	0s
OMP Worker Thread #2 (TID: 27116)	0s	0.010s	0.106s	0.066s	0.352s	3.039s	0s
OMP Worker Thread #3 (TID: 21840)	0s	0.013s	0.089s	0.011s	0.352s	3.078s	0s
OMP Worker Thread #4 (TID: 25788)	0s	0.009s	0.097s	0.033s	0.352s	3.073s	0s
OMP Worker Thread #5 (TID: 27596)	0s	0.012s	0.115s	0.020s	0.352s	3.078s	0s
OMP Worker Thread #6 (TID: 24976)	0s	0s	0.093s	0.022s	0.352s	3.076s	0s
OMP Worker Thread #7 (TID: 25860)	0s	0.007s	0.087s	0.032s	0.352s	3.073s	0s
OMP Worker Thread #8 (TID: 19196)	0s	0s	0.117s	0.033s	0.352s	3.065s	0s
OMP Worker Thread #9 (TID: 26464)	0s	0.011s	0.089s	0.039s	0.352s	3.069s	0s

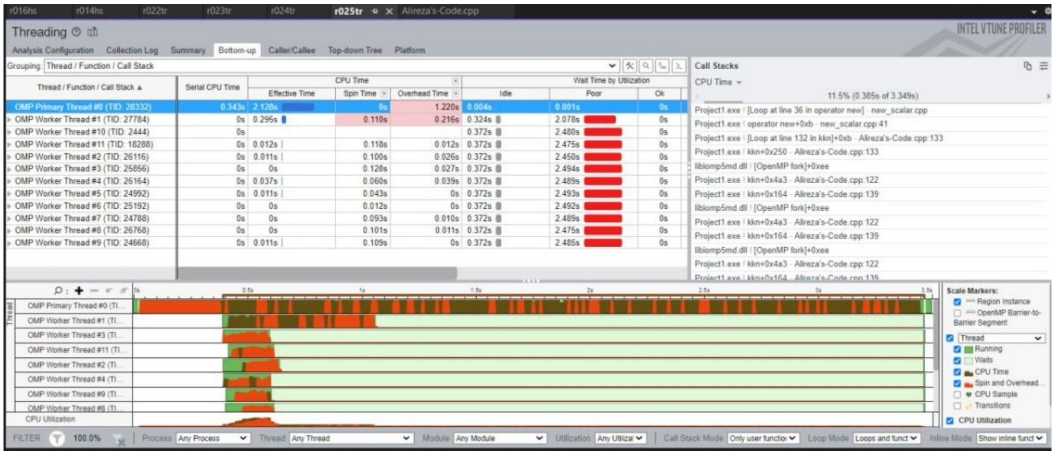
Call Stacks

CPU Time

8.8% (0.340s of 3.861s)

```
Project1.exe ! [Loop at line 36 in operator new] - new_scalar.cpp
Project1.exe ! operator new+0xb - new_scalar.cpp:41
Project1.exe ! [Loop at line 132 in kkn]+0xb - Alireza's-Code.cpp:133
Project1.exe ! kkn+0x250 - Alireza's-Code.cpp:133
libiomp5md.dll ! [OpenMP fork]+0xee
Project1.exe ! kkn+0x4a3 - Alireza's-Code.cpp:122
Project1.exe ! kkn+0x164 - Alireza's-Code.cpp:139
libiomp5md.dll ! [OpenMP fork]+0xee
Project1.exe ! kkn+0x4a3 - Alireza's-Code.cpp:122
Project1.exe ! kkn+0x164 - Alireza's-Code.cpp:139
libiomp5md.dll ! [OpenMP fork]+0xee
Project1.exe ! kkn+0x4a3 - Alireza's-Code.cpp:122
Project1.exe ! kkn+0x164 - Alireza's-Code.cpp:139
```

Process: Any Process | Thread: Any Thread | Module: Any Module | Utilization: Any Utilizat | Call Stack Mode: Only user functio | Loop Mode: Loops and funct | Inline Mode: Show inline funct



Grouping: Thread / Function / Call Stack

Thread / Function / Call Stack	Serial CPU Time	CPU Time			Wait Time by Utilization		
		Effective Time	Spin Time	Overhead Time	Idle	Poor	Ok
OMP Primary Thread #0 (TID: 28332)	0.343s	2.128s	0s	1.220s	0.004s	0.001s	0s
OMP Worker Thread #1 (TID: 27784)	0s	0.295s	0.110s	0.216s	0.324s	2.078s	0s
OMP Worker Thread #10 (TID: 2444)	0s				0.372s	2.480s	0s
OMP Worker Thread #11 (TID: 18288)	0s	0.012s	0.118s	0.012s	0.372s	2.475s	0s
OMP Worker Thread #2 (TID: 26116)	0s	0.011s	0.100s	0.026s	0.372s	2.450s	0s
OMP Worker Thread #3 (TID: 25856)	0s	0s	0.128s	0.027s	0.372s	2.494s	0s
OMP Worker Thread #4 (TID: 26164)	0s	0.037s	0.060s	0.039s	0.372s	2.489s	0s
OMP Worker Thread #5 (TID: 24992)	0s	0.011s	0.043s	0s	0.372s	2.493s	0s
OMP Worker Thread #6 (TID: 25192)	0s	0s	0.012s	0s	0.372s	2.492s	0s
OMP Worker Thread #7 (TID: 24788)	0s	0s	0.093s	0.010s	0.372s	2.489s	0s
OMP Worker Thread #8 (TID: 26768)	0s	0s	0.101s	0.011s	0.372s	2.475s	0s
OMP Worker Thread #9 (TID: 24668)	0s	0.011s	0.109s	0s	0.372s	2.485s	0s

Call Stacks

CPU Time

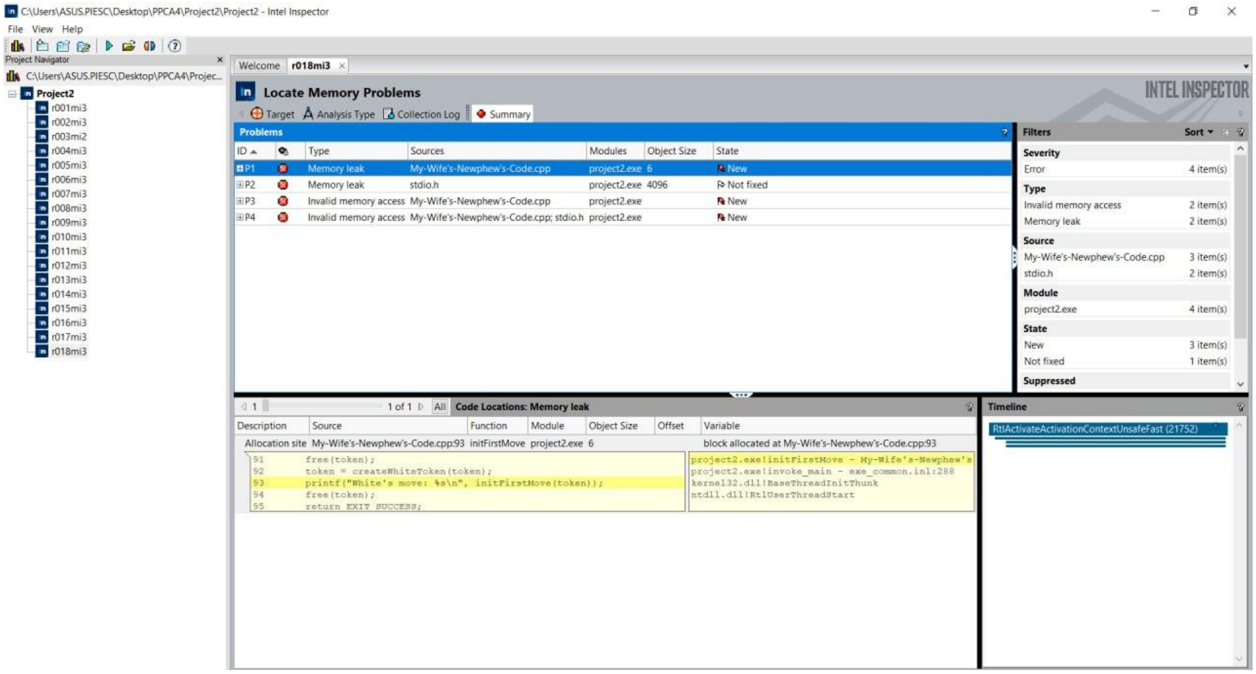
11.5% (0.385s of 3.349s)

```
Project1.exe ! [Loop at line 36 in operator new] - new_scalar.cpp
Project1.exe ! operator new+0xb - new_scalar.cpp:41
Project1.exe ! [Loop at line 132 in kkn]+0xb - Alireza's-Code.cpp:133
Project1.exe ! kkn+0x250 - Alireza's-Code.cpp:133
libiomp5md.dll ! [OpenMP fork]+0xee
Project1.exe ! kkn+0x4a3 - Alireza's-Code.cpp:122
Project1.exe ! kkn+0x164 - Alireza's-Code.cpp:139
libiomp5md.dll ! [OpenMP fork]+0xee
Project1.exe ! kkn+0x4a3 - Alireza's-Code.cpp:122
Project1.exe ! kkn+0x164 - Alireza's-Code.cpp:139
libiomp5md.dll ! [OpenMP fork]+0xee
Project1.exe ! kkn+0x4a3 - Alireza's-Code.cpp:122
Project1.exe ! kkn+0x164 - Alireza's-Code.cpp:139
```

Process: Any Process | Thread: Any Thread | Module: Any Module | Utilization: Any Utilizat | Call Stack Mode: Only user functio | Loop Mode: Loops and funct | Inline Mode: Show inline funct

In order, the first image shows **Dynamic 6**, **Dynamic 3**, and **Static 3**.

Part 2



Locate Memory Problems

Problems

ID		Type	Sources	Modules	Object Size	State
⊞P1	●	Memory leak	My-Wife's-Newphew's-Code.cpp	project2.exe	6	New
⊞P2	●	Memory leak	stdio.h	project2.exe	4096	Not fixed
⊞P3	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp	project2.exe		New
⊞P4	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New

Filters Sort

Severity	
Error	4 item(s)
Type	
Invalid memory access	2 item(s)
Memory leak	2 item(s)
Source	
My-Wife's-Newphew's-Code.cpp	3 item(s)
stdio.h	2 item(s)
Module	
project2.exe	4 item(s)
State	
New	3 item(s)
Not fixed	1 item(s)
Suppressed	

1 1 of 1 All **Code Locations: Memory leak**

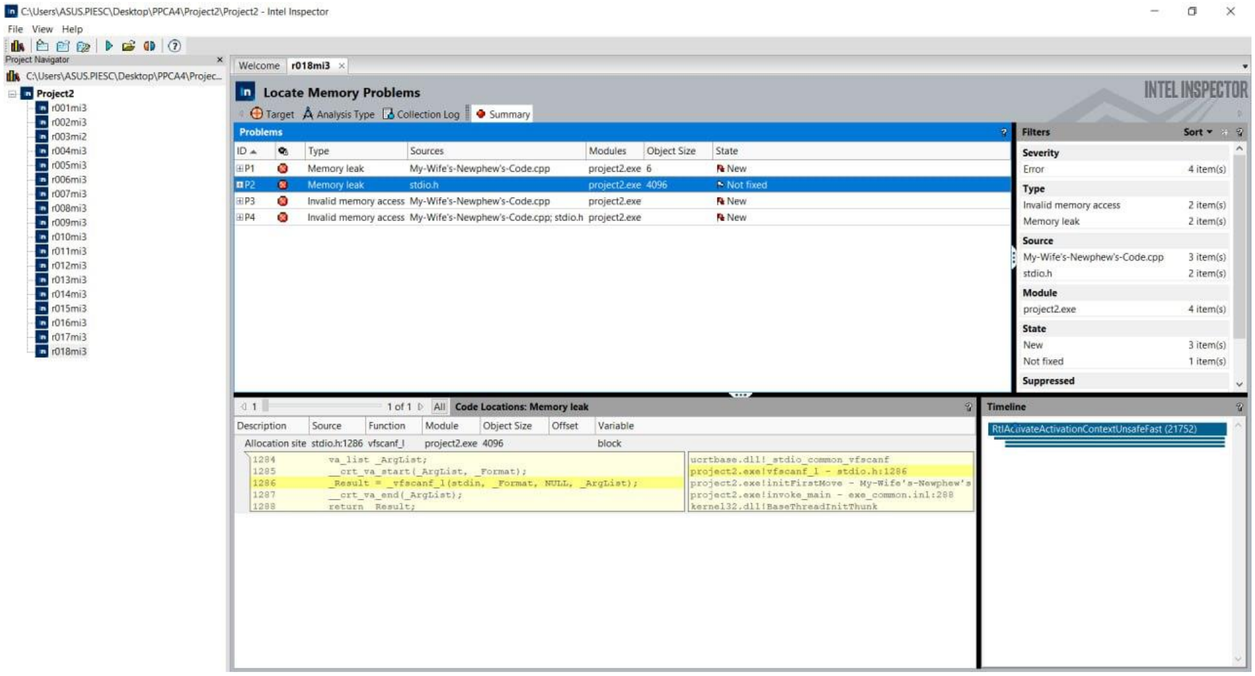
Description	Source	Function	Module	Object Size	Offset	Variable
Allocation site	My-Wife's-Newphew's-Code.cpp:93	initFirstMove	project2.exe	6		block allocated at My-Wife's-Newphew's-Code.cpp:93

```
    free(token);
    token = createWhiteToken(token);
    printf("White's move: %s\n", initFirstMove(token));
    free(token);
    return EXIT_SUCCESS;
```

```
project2.exe!initFirstMove - My-Wife's-Newphew's
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
ntdll.dll!RtlUserThreadStart
```

Timeline

RtlActivateActivationContextUnsafeFast (21752)



Locate Memory Problems

Problems

ID		Type	Sources	Modules	Object Size	State
⊞P1	●	Memory leak	My-Wife's-Newphew's-Code.cpp	project2.exe	6	New
⊞P2	●	Memory leak	stdio.h	project2.exe	4096	Not fixed
⊞P3	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp	project2.exe		New
⊞P4	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New

Filters Sort

Severity	
Error	4 item(s)
Type	
Invalid memory access	2 item(s)
Memory leak	2 item(s)
Source	
My-Wife's-Newphew's-Code.cpp	3 item(s)
stdio.h	2 item(s)
Module	
project2.exe	4 item(s)
State	
New	3 item(s)
Not fixed	1 item(s)
Suppressed	

1 1 of 1 All **Code Locations: Memory leak**

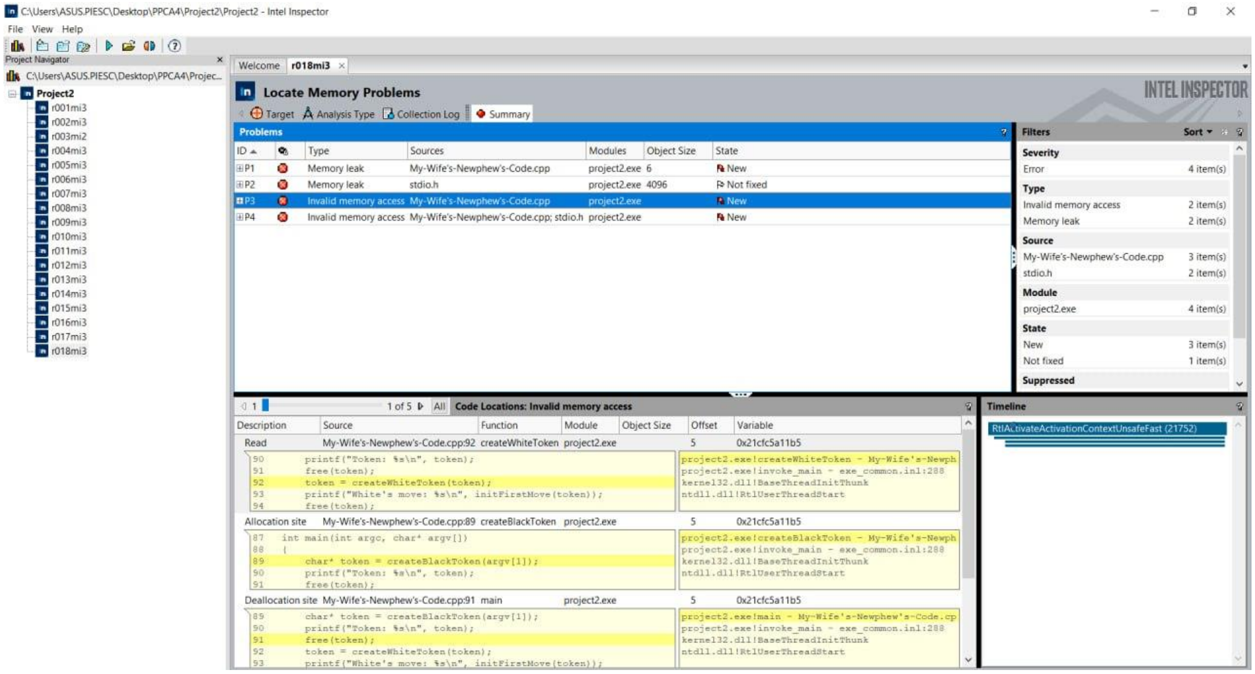
Description	Source	Function	Module	Object Size	Offset	Variable
Allocation site	stdio.h:1286	vfscanf_l	project2.exe	4096		block

```
    va_list _ArgList;
    __crt_va_start(_ArgList, _Format);
    _Result = _vfscanf_l(stdin, _Format, NULL, _ArgList);
    __crt_va_end(_ArgList);
    return _Result;
```

```
ucrtbase.dll!_stdio_common_vfscanf
project2.exe!vfscanf_l - stdio.h:1286
project2.exe!initFirstMove - My-Wife's-Newphew's
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
```

Timeline

RtlActivateActivationContextUnsafeFast (21752)



Problems

ID		Type	Sources	Modules	Object Size	State
P1	●	Memory leak	My-Wife's-Newphew's-Code.cpp	project2.exe	6	New
P2	●	Memory leak	stdio.h	project2.exe	4096	Not fixed
P3	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp	project2.exe		New
P4	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New

Filters

Severity	
Error	4 item(s)
Type	
Invalid memory access	2 item(s)
Memory leak	2 item(s)
Source	
My-Wife's-Newphew's-Code.cpp	3 item(s)
stdio.h	2 item(s)
Module	
project2.exe	4 item(s)
State	
New	3 item(s)
Not fixed	1 item(s)
Suppressed	

1 of 5 All Code Locations: Invalid memory access

Description	Source	Function	Module	Object Size	Offset	Variable
Read	My-Wife's-Newphew's-Code.cpp:92	createWhiteToken	project2.exe		5	0x21cfc5a11b5

```
    printf("Token: %s\n", token);
    free(token);
    token = createWhiteToken(token);
    printf("White's move: %s\n", initFirstMove(token));
    free(token);
```

```
project2.exe!createWhiteToken - My-Wife's-Newph
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
ntdll.dll!RtlUserThreadStart
```

Description	Source	Function	Module	Object Size	Offset	Variable
Allocation site	My-Wife's-Newphew's-Code.cpp:89	createBlackToken	project2.exe		5	0x21cfc5a11b5

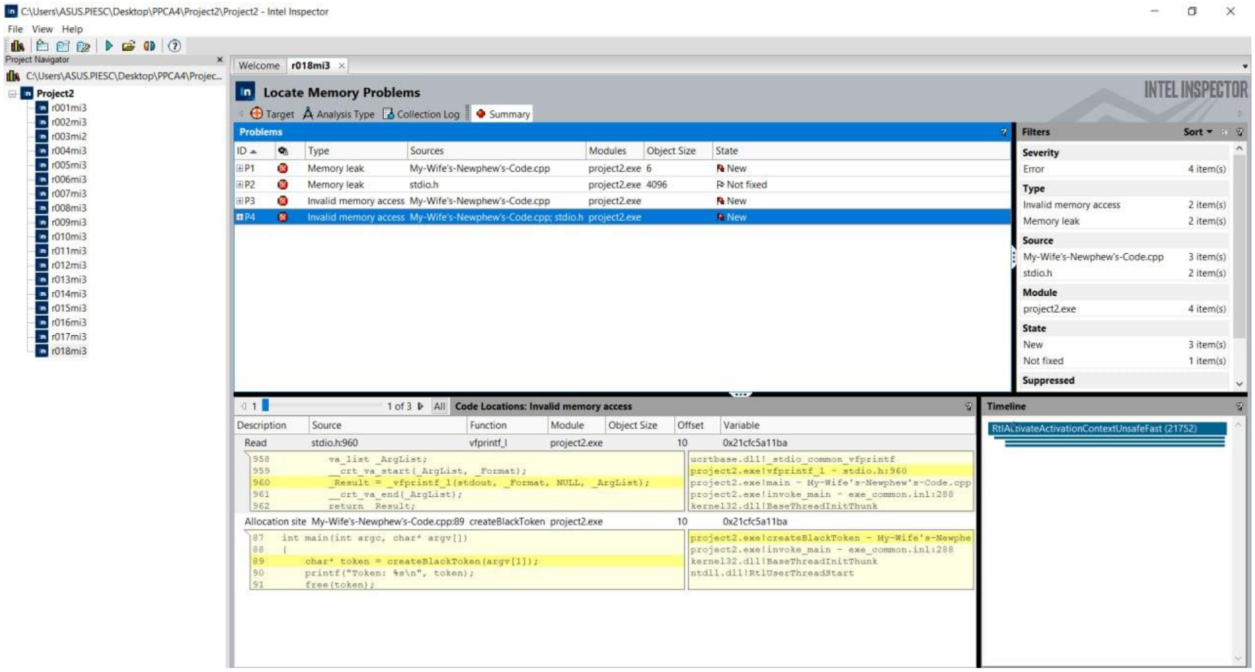
```
int main(int argc, char* argv[])
{
    char* token = createBlackToken(argv[1]);
    printf("Token: %s\n", token);
    free(token);
```

```
project2.exe!createBlackToken - My-Wife's-Newph
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
ntdll.dll!RtlUserThreadStart
```

Description	Source	Function	Module	Object Size	Offset	Variable
Deallocation site	My-Wife's-Newphew's-Code.cpp:91	main	project2.exe		5	0x21cfc5a11b5

```
    char* token = createBlackToken(argv[1]);
    printf("Token: %s\n", token);
    free(token);
    token = createWhiteToken(token);
    printf("White's move: %s\n", initFirstMove(token));
```

```
project2.exe!main - My-Wife's-Newphew's-Code.cp
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
ntdll.dll!RtlUserThreadStart
```



Problems

ID		Type	Sources	Modules	Object Size	State
P1	●	Memory leak	My-Wife's-Newphew's-Code.cpp	project2.exe	6	New
P2	●	Memory leak	stdio.h	project2.exe	4096	Not fixed
P3	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp	project2.exe		New
P4	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New

Filters

Severity	
Error	4 item(s)
Type	
Invalid memory access	2 item(s)
Memory leak	2 item(s)
Source	
My-Wife's-Newphew's-Code.cpp	3 item(s)
stdio.h	2 item(s)
Module	
project2.exe	4 item(s)
State	
New	3 item(s)
Not fixed	1 item(s)
Suppressed	

1 of 3 All Code Locations: Invalid memory access

Description	Source	Function	Module	Object Size	Offset	Variable
Read	stdio.h:960	vfprintf_l	project2.exe		10	0x21cfc5a11ba

```
        va_list _ArgList;
        __crt_va_start(_ArgList, _Format);
        _Result = _vfprintf_l(stdout, _Format, NULL, _ArgList);
        __crt_va_end(_ArgList);
        return _Result;
```

```
ucrtbase.dll!_stdio_common_vfprintf
project2.exe!vfprintf_l - stdio.h:960
project2.exe!main - My-Wife's-Newphew's-Code.cpp
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
```

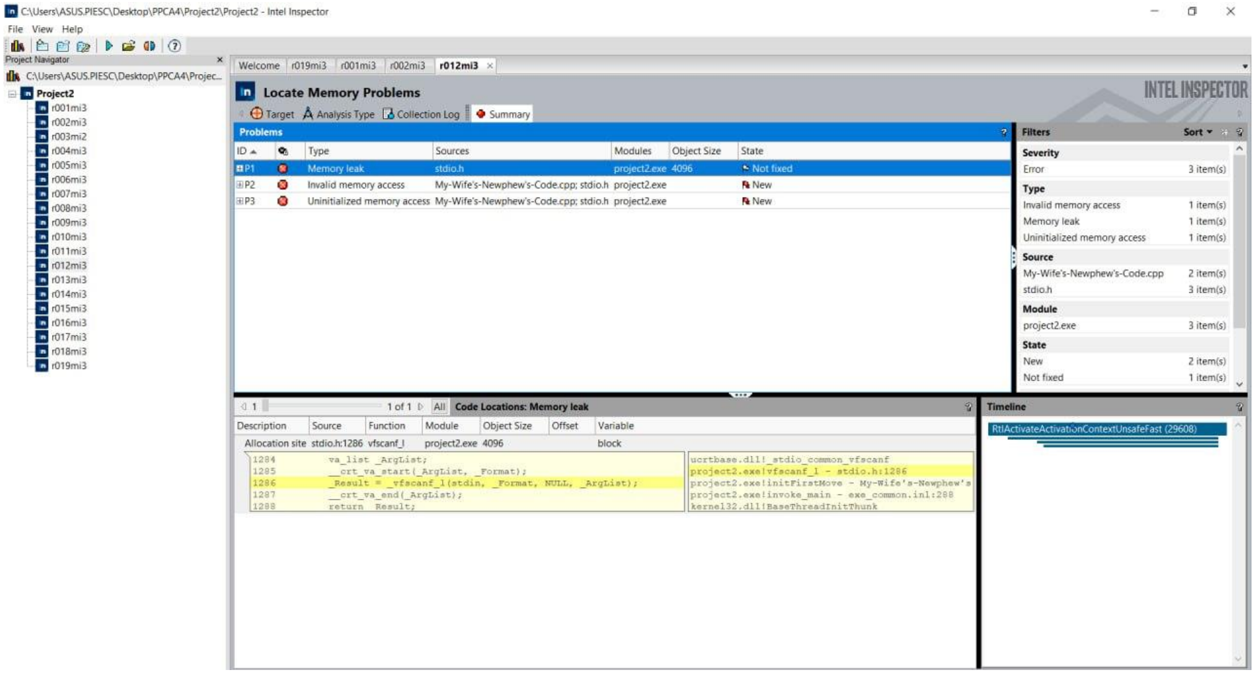
Description	Source	Function	Module	Object Size	Offset	Variable
Allocation site	My-Wife's-Newphew's-Code.cpp:89	createBlackToken	project2.exe		10	0x21cfc5a11ba

```
int main(int argc, char* argv[])
{
    char* token = createBlackToken(argv[1]);
    printf("Token: %s\n", token);
    free(token);
```

```
project2.exe!createBlackToken - My-Wife's-Newphe
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
ntdll.dll!RtlUserThreadStart
```

The previous **4 images** show the **initial results** obtained from the code of the second section.

Now, the next **3 images** show the steps taken to **address these issues**.


C:\Users\ASUS.PIESC\Desktop\PPCA4\Project2\Project2 - Intel Inspector
File View Help
Project Navigator
C:\Users\ASUS.PIESC\Desktop\PPCA4\Projec...
Project2
r001mi3
r002mi3
r003mi2
r004mi3
r005mi3
r006mi3
r007mi3
r008mi3
r009mi3
r010mi3
r011mi3
r012mi3
r013mi3
r014mi3
r015mi3
r016mi3
r017mi3
r018mi3
r019mi3
Welcome r019mi3 r001mi3 r002mi3 r012mi3
Locate Memory Problems
INTEL INSPECTOR
Target Analysis Type Collection Log Summary
Problems
Filters Sort
Timeline
RtlActivateActivationContextUnsafeFast (29608)

ID		Type	Sources	Modules	Object Size	State
P1	●	Memory leak	stdio.h	project2.exe	4096	Not fixed
P2	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New
P3	●	Uninitialized memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New

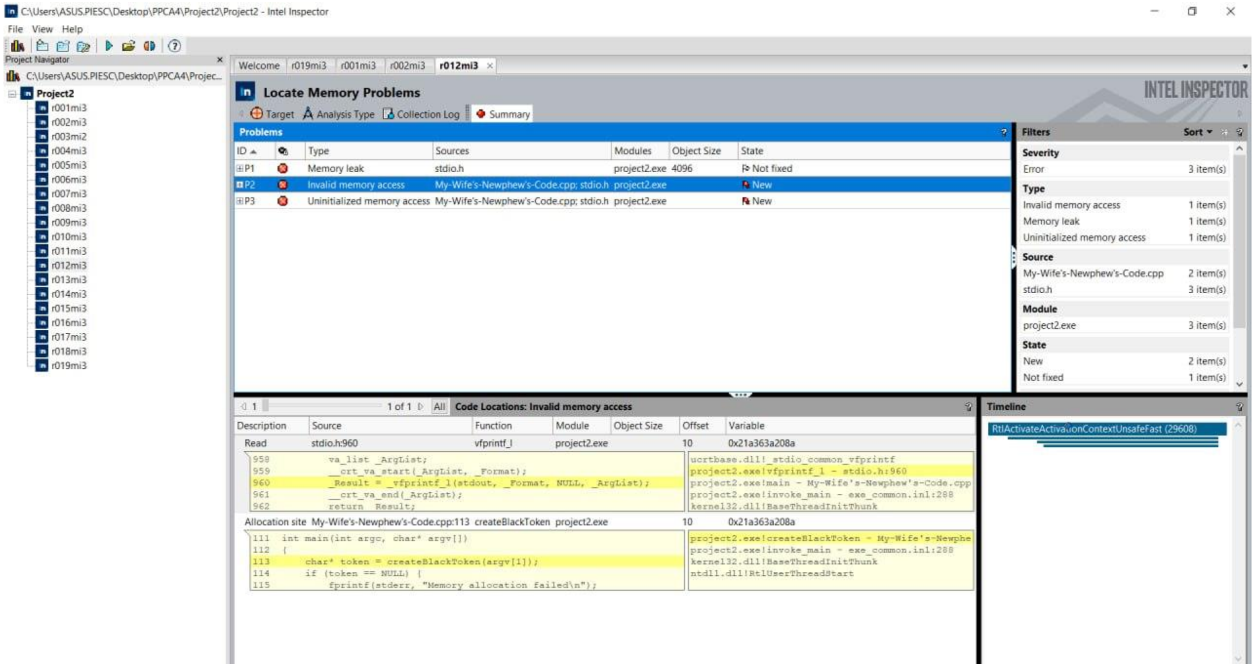
Filters	
Severity	
Error	3 item(s)
Type	
Invalid memory access	1 item(s)
Memory leak	1 item(s)
Uninitialized memory access	1 item(s)
Source	
My-Wife's-Newphew's-Code.cpp	2 item(s)
stdio.h	3 item(s)
Module	
project2.exe	3 item(s)
State	
New	2 item(s)
Not fixed	1 item(s)

1 1 of 1 All **Code Locations: Memory leak**

Description	Source	Function	Module	Object Size	Offset	Variable
Allocation site	stdio.h:1286	vfscanf_l	project2.exe	4096		block

```
        va_list _ArgList;
        __crt_va_start(_ArgList, _Format);
        _Result = _vfscanf_l(stdin, _Format, NULL, _ArgList);
        __crt_va_end(_ArgList);
        return _Result;
```

```
ucrtbase.dll!_stdio_common_vfscanf
project2.exe!vfscanf_l - stdio.h:1286
project2.exe!initFirstMove - My-Wife's-Newphew's
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
```


C:\Users\ASUS.PIESC\Desktop\PPCA4\Project2\Project2 - Intel Inspector
File View Help
Project Navigator
C:\Users\ASUS.PIESC\Desktop\PPCA4\Projec...
Project2
r001mi3
r002mi3
r003mi2
r004mi3
r005mi3
r006mi3
r007mi3
r008mi3
r009mi3
r010mi3
r011mi3
r012mi3
r013mi3
r014mi3
r015mi3
r016mi3
r017mi3
r018mi3
r019mi3
Welcome r019mi3 r001mi3 r002mi3 r012mi3
Locate Memory Problems
INTEL INSPECTOR
Target Analysis Type Collection Log Summary
Problems
Filters Sort
Timeline
RtlActivateActivationContextUnsafeFast (29608)

ID		Type	Sources	Modules	Object Size	State
P1	●	Memory leak	stdio.h	project2.exe	4096	Not fixed
P2	●	Invalid memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New
P3	●	Uninitialized memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New

Filters	
Severity	
Error	3 item(s)
Type	
Invalid memory access	1 item(s)
Memory leak	1 item(s)
Uninitialized memory access	1 item(s)
Source	
My-Wife's-Newphew's-Code.cpp	2 item(s)
stdio.h	3 item(s)
Module	
project2.exe	3 item(s)
State	
New	2 item(s)
Not fixed	1 item(s)

1 1 of 1 All **Code Locations: Invalid memory access**

Description	Source	Function	Module	Object Size	Offset	Variable
Read	stdio.h:960	vfprintf_l	project2.exe		10	0x21a363a208a

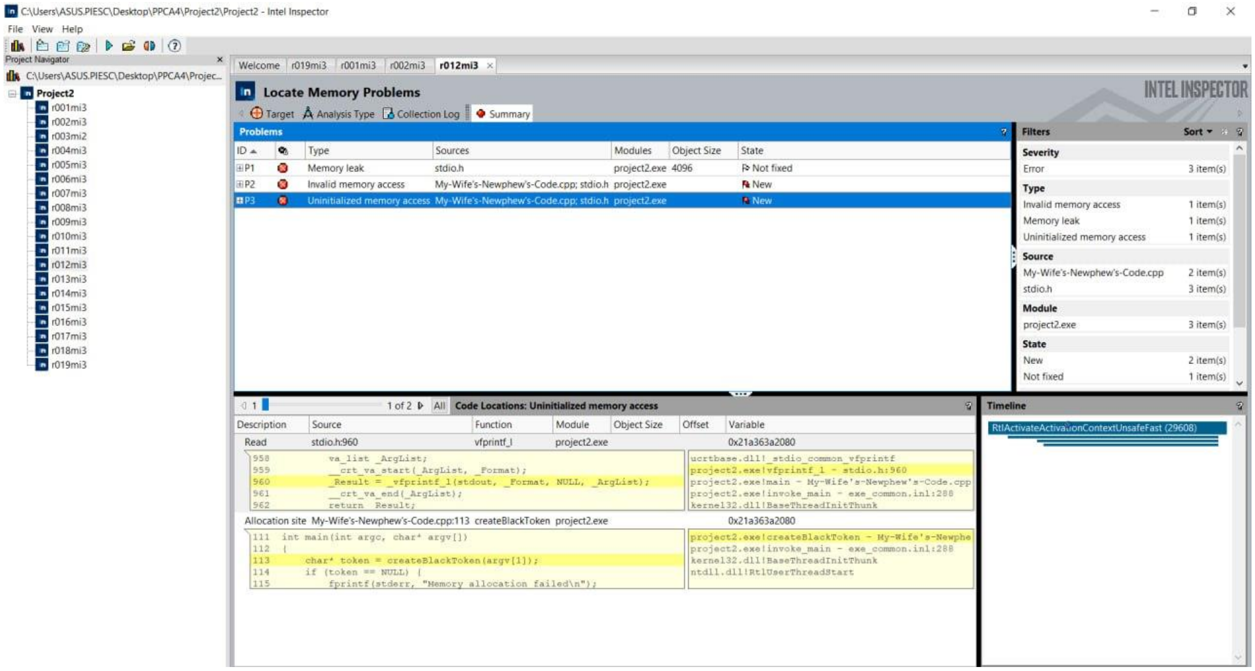
```
        va_list _ArgList;
        __crt_va_start(_ArgList, _Format);
        _Result = _vfprintf_l(stdout, _Format, NULL, _ArgList);
        __crt_va_end(_ArgList);
        return _Result;
```

```
ucrtbase.dll!_stdio_common_vfprintf
project2.exe!vfprintf_l - stdio.h:960
project2.exe!main - My-Wife's-Newphew's-Code.cpp
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
```

Description	Source	Function	Module	Object Size	Offset	Variable
Allocation site	My-Wife's-Newphew's-Code.cpp:113	createBlackToken	project2.exe		10	0x21a363a208a

```
int main(int argc, char* argv[])
{
    char* token = createBlackToken(argv[1]);
    if (token == NULL) {
        fprintf(stderr, "Memory allocation failed\n");
```

```
project2.exe!createBlackToken - My-Wife's-Newphe
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
ntdll.dll!RtlUserThreadStart
```



C:\Users\ASUS.PIESC\Desktop\PPCA4\Project2\Project2 - Intel Inspector

Locate Memory Problems (r012mi3)

ID	Type	Sources	Modules	Object Size	State
P1	Memory leak	stdio.h	project2.exe	4096	Not fixed
P2	Invalid memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New
P3	Uninitialized memory access	My-Wife's-Newphew's-Code.cpp; stdio.h	project2.exe		New

Filters	
Severity	
Error	3 item(s)
Type	
Invalid memory access	1 item(s)
Memory leak	1 item(s)
Uninitialized memory access	1 item(s)
Source	
My-Wife's-Newphew's-Code.cpp	2 item(s)
stdio.h	3 item(s)
Module	
project2.exe	3 item(s)
State	
New	2 item(s)
Not fixed	1 item(s)

Code Locations: Uninitialized memory access (1 of 2)

Description	Source	Function	Module	Object Size	Offset	Variable
Read	stdio.h:960	vfprintf_l	project2.exe			0x21a363a2080

```
        va_list _ArgList;
        __crt_va_start(_ArgList, _Format);
        _Result = _vfprintf_l(stdout, _Format, NULL, _ArgList);
        __crt_va_end(_ArgList);
        return _Result;
```

```
ucrtbase.dll!_stdio_common_vfprintf
project2.exe!vfprintf_l - stdio.h:960
project2.exe!main - My-Wife's-Newphew's-Code.cpp
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
```

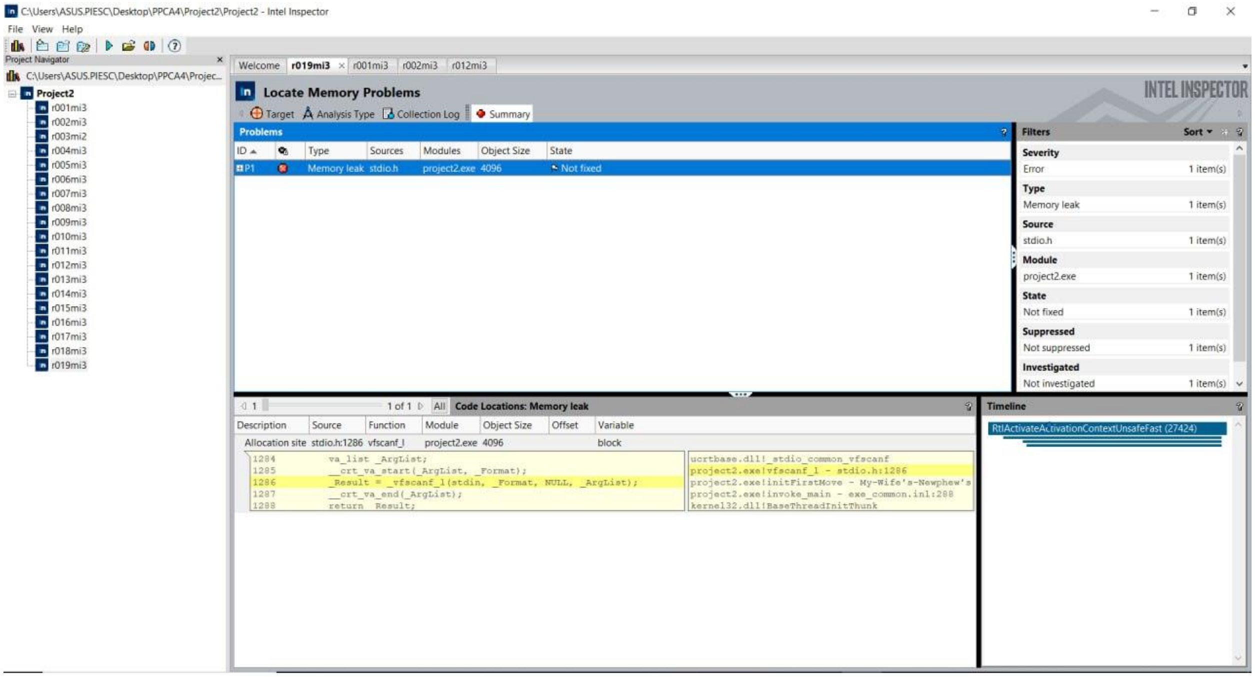
Description	Source	Function	Module	Object Size	Offset	Variable
Allocation site	My-Wife's-Newphew's-Code.cpp:113	createBlackToken	project2.exe			0x21a363a2080

```
int main(int argc, char* argv[])
{
    char* token = createBlackToken(argv[1]);
    if (token == NULL) {
        fprintf(stderr, "Memory allocation failed\n");
```

```
project2.exe!createBlackToken - My-Wife's-Newphe
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
ntdll.dll!RtlUserThreadStart
```

Timeline: RtlActivateActivationContextUnsafeFast (29608)

Finally, the **output** is shown in the image below. The only error encountered is related to the **stdio library**.



C:\Users\ASUS.PIESC\Desktop\PPCA4\Project2\Project2 - Intel Inspector

Locate Memory Problems (r019mi3)

ID	Type	Sources	Modules	Object Size	State
P1	Memory leak	stdio.h	project2.exe	4096	Not fixed

Filters	
Severity	
Error	1 item(s)
Type	
Memory leak	1 item(s)
Source	
stdio.h	1 item(s)
Module	
project2.exe	1 item(s)
State	
Not fixed	1 item(s)
Suppressed	
Not suppressed	1 item(s)
Investigated	
Not investigated	1 item(s)

Code Locations: Memory leak (1 of 1)

Description	Source	Function	Module	Object Size	Offset	Variable
Allocation site	stdio.h:1286	vfscanf_l	project2.exe	4096		block

```
        va_list _ArgList;
        __crt_va_start(_ArgList, _Format);
        _Result = _vfscanf_l(stdin, _Format, NULL, _ArgList);
        __crt_va_end(_ArgList);
        return _Result;
```

```
ucrtbase.dll!_stdio_common_vfscanf
project2.exe!vfscanf_l - stdio.h:1286
project2.exe!initFirstMove - My-Wife's-Newphew's
project2.exe!invoke_main - exe_common.inl:288
kernel32.dll!BaseThreadInitThunk
```

Timeline: RtlActivateActivationContextUnsafeFast (27424)