

Debug: Breakpoint

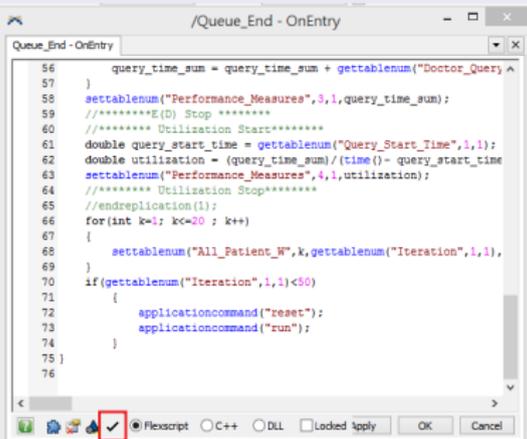
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Debug

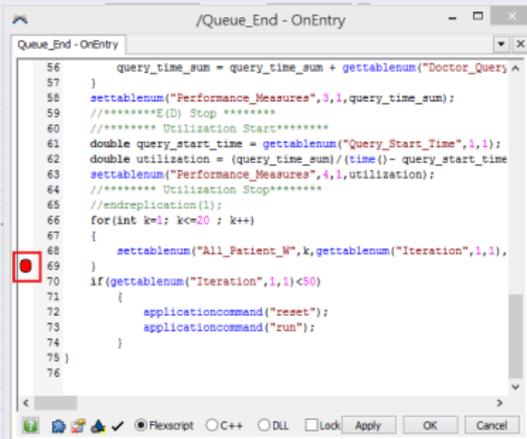
- 當 Flexsim 執行時出現跟預期不符的狀況,可能是程式有問題
- 程式的錯誤分為:
 - 語法錯誤:透過程式視窗左下角的 Check Syntax 來檢查
 - 邏輯錯誤:透過 Breakpoint 觀察變數找原因

語法錯誤



```
56 query_time_sum = query_time_sum + gettablenum("Doctor_Query",1,1);
57 }
58 settablenum("Performance_Measures",3,1,query_time_sum);
59 //*****E(D) Stop *****
60 //***** Utilization Start*****
61 double query_start_time = gettablenum("Query_Start_Time",1,1);
62 double utilization = (query_time_sum)/(time()- query_start_time);
63 settablenum("Performance_Measures",4,1,utilization);
64 //***** Utilization Stop*****
65 //endreplication(1);
66 for(int k=1; k<=20; k++)
67 {
68     settablenum("All_Patient_W",k,gettablenum("Iteration",1,1),
69     );
70 }
71 if(gettablenum("Iteration",1,1)<50)
72 {
73     applicationcommand("reset");
74     applicationcommand("run");
75 }
76
```

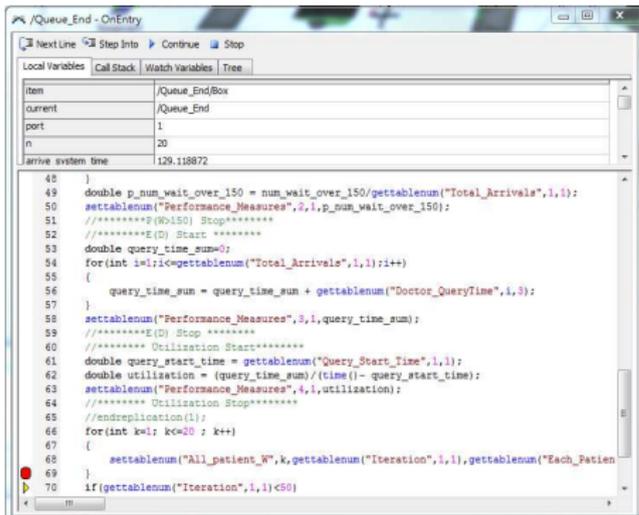
邏輯錯誤



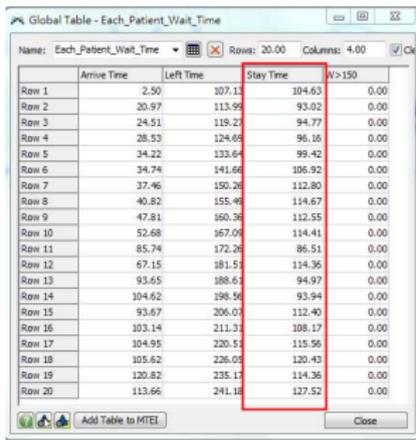
```
56 query_time_sum = query_time_sum + gettablenum("Doctor_Query",1,1);
57 }
58 settablenum("Performance_Measures",3,1,query_time_sum);
59 //*****E(D) Stop *****
60 //***** Utilization Start*****
61 double query_start_time = gettablenum("Query_Start_Time",1,1);
62 double utilization = (query_time_sum)/(time()- query_start_time);
63 settablenum("Performance_Measures",4,1,utilization);
64 //***** Utilization Stop*****
65 //endreplication(1);
66 for(int k=1; k<=20; k++)
67 {
68     settablenum("All_Patient_W",k,gettablenum("Iteration",1,1),
69     );
70 }
71 if(gettablenum("Iteration",1,1)<50)
72 {
73     applicationcommand("reset");
74     applicationcommand("run");
75 }
76
```

Breakpoint Example 1: Pe Model

- PE Model 的 Queue_End → OnEntry
- 程式視窗中, 用滑鼠點行數左邊空白處, 會看到一個大紅點, 即為 Breakpoint, 程式在執行到此行時會停下來
- 將 Breakpoint 設在 69 行, 可以看到 Global Table `Each_Patient_Wait_Time` 的 Column 3 記錄到 Global Table `All_Patient_W`



```
48 }
49 double p_num_wait_over_150 = num_wait_over_150/gettablenum("Total_Arrivals",1,1);
50 settablenum("Performance_Measures",3,1,p_num_wait_over_150);
51 //*****E(B>150) Stop*****
52 //*****E(D) Start*****
53 double query_time_sum=0;
54 for(int i=1;i<=gettablenum("Total_Arrivals",1,1);i++)
55 {
56     query_time_sum = query_time_sum + gettablenum("Doctor_QueryTime",1,3);
57 }
58 settablenum("Performance_Measures",3,1,query_time_sum);
59 //*****E(D) Stop*****
60 //***** Utilization Start*****
61 double query_start_time = gettablenum("Query_Start_Time",1,1);
62 double utilization = (query_time_sum)/(time()-query_start_time);
63 settablenum("Performance_Measures",4,1,utilization);
64 //***** Utilization Stop*****
65 //endreplication(1);
66 for(int k=1; k<=20 ; k++)
67 {
68     settablenum("All_patient_W",k,gettablenum("Iteration",1,1),gettablenum("Each_Patient
69 }
70 if(gettablenum("Iteration",1,1)<=50)
```



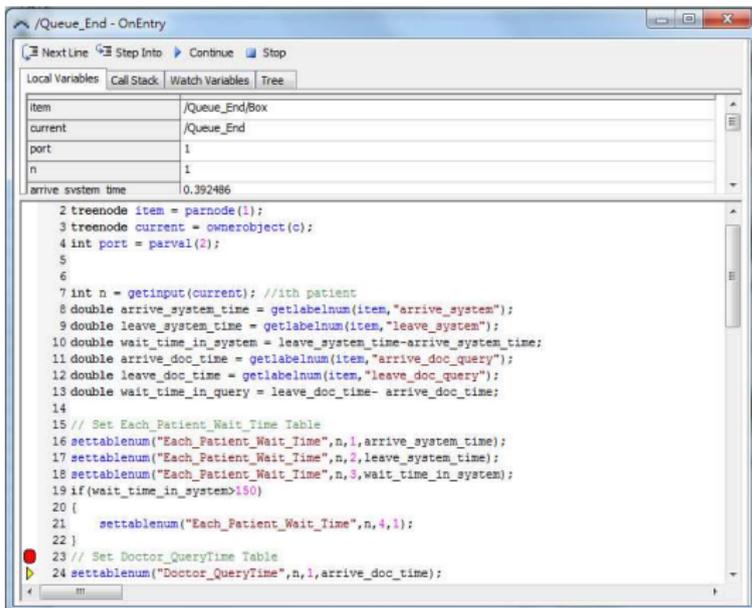
Row	Arrive Time	Left Time	Stay Time	N>150	0.00
Row 1	2.50	207.1	104.63	0.00	0.00
Row 2	20.97	113.99	93.02	0.00	0.00
Row 3	24.51	119.2	94.77	0.00	0.00
Row 4	28.53	124.60	96.16	0.00	0.00
Row 5	34.22	133.6	99.42	0.00	0.00
Row 6	34.74	141.66	106.92	0.00	0.00
Row 7	37.46	150.26	112.80	0.00	0.00
Row 8	40.82	155.46	114.67	0.00	0.00
Row 9	47.81	160.36	112.55	0.00	0.00
Row 10	52.68	167.00	114.41	0.00	0.00
Row 11	85.74	172.26	86.51	0.00	0.00
Row 12	67.15	181.5	114.36	0.00	0.00
Row 13	93.65	188.6	94.97	0.00	0.00
Row 14	104.62	198.56	93.94	0.00	0.00
Row 15	93.67	206.07	112.40	0.00	0.00
Row 16	103.14	211.3	108.17	0.00	0.00
Row 17	104.95	220.5	115.56	0.00	0.00
Row 18	105.62	226.55	120.43	0.00	0.00
Row 19	120.82	235.17	114.36	0.00	0.00
Row 20	113.66	241.18	127.52	0.00	0.00



Row	Replication1	Replication2	0.00
Patient1	104.63	93.02	0.00
Patient2	93.02	94.77	0.00
Patient3	94.77	96.16	0.00
Row 4	96.16	99.42	0.00
Row 5	99.42	106.92	0.00
Row 6	106.92	112.80	0.00
Row 7	112.80	114.67	0.00
Row 8	114.67	112.55	0.00
Row 9	112.55	114.41	0.00
Row 10	114.41	86.51	0.00
Row 11	86.51	114.36	0.00
Row 12	114.36	94.97	0.00
Row 13	94.97	93.94	0.00
Row 14	93.94	112.40	0.00
Row 15	112.40	108.17	0.00
Row 16	108.17	115.56	0.00
Row 17	115.56	120.43	0.00
Row 18	120.43	114.36	0.00
Row 19	114.36	127.52	0.00
Row 20	127.52		0.00

Breakpoint Example 2: PE Model

- 將 Breakpoint 設在 23 行, 程式在執行到此行時會停下來, 結果 (Next page)



The screenshot shows a debugger window titled "/Queue_End - OnEntry". The interface includes a menu bar with "NextLine", "Step Into", "Continue", and "Stop". Below the menu are tabs for "Local Variables", "Call Stack", "Watch Variables", and "Tree". The "Local Variables" tab is active, displaying a table of variables:

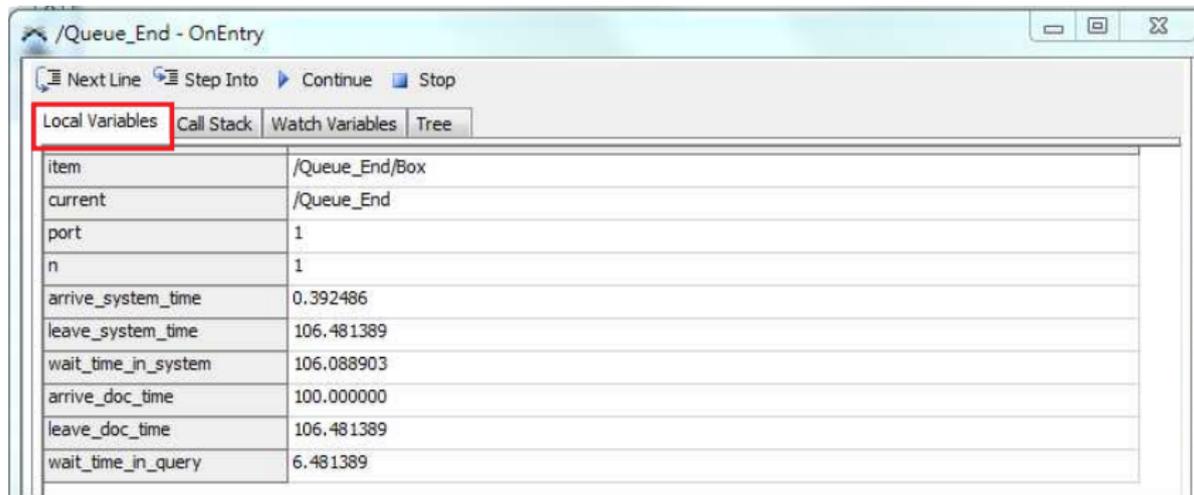
Variable	Value
Item	/Queue_End/Box
current	/Queue_End
port	1
n	1
arrive system time	0.392486

The main window displays the source code of the program. A red dot indicates a breakpoint is set at line 24. The code is as follows:

```
2 treenode item = parnode(1);
3 treenode current = ownerobject(c);
4 int port = parval(2);
5
6
7 int n = getinput(current); //1th patient
8 double arrive_system_time = getlabelnum(item,"arrive_system");
9 double leave_system_time = getlabelnum(item,"leave_system");
10 double wait_time_in_system = leave_system_time-arrive_system_time;
11 double arrive_doc_time = getlabelnum(item,"arrive_doc_query");
12 double leave_doc_time = getlabelnum(item,"leave_doc_query");
13 double wait_time_in_query = leave_doc_time- arrive_doc_time;
14
15 // Set Each_Patient_Wait_Time Table
16 settablenum("Each_Patient_Wait_Time",n,1,arrive_system_time);
17 settablenum("Each_Patient_Wait_Time",n,2,leave_system_time);
18 settablenum("Each_Patient_Wait_Time",n,3,wait_time_in_system);
19 if(wait_time_in_system>150)
20 {
21     settablenum("Each_Patient_Wait_Time",n,4,1);
22 }
23 // Set Doctor_QueryTime Table
24 settablenum("Doctor_QueryTime",n,1,arrive_doc_time);
```

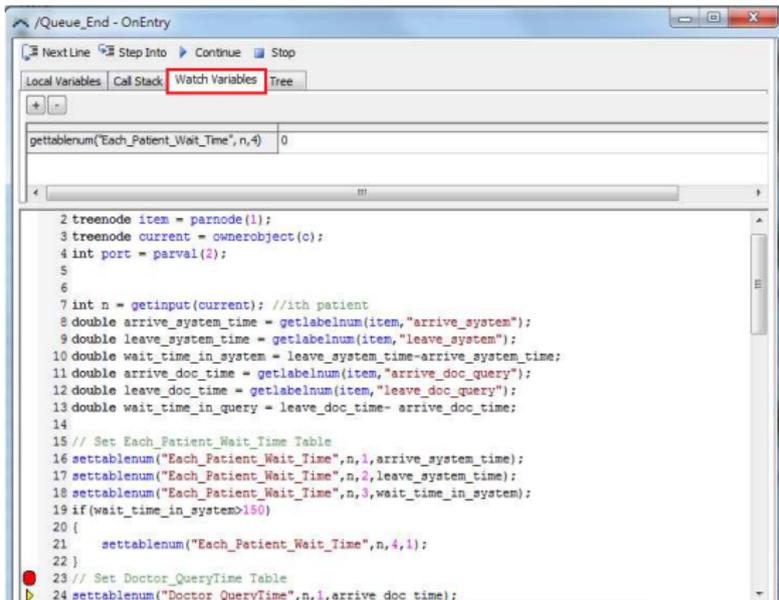
Breakpoint: Local Variables

- 將 Breakpoint 設在 23 行, 程式在執行到此行時會停下來, 如下圖
- Local Variables 可以看到 Queue_End → OnEntry 程式中的所有變數



Breakpoint: Watch Variables

- 將 Breakpoint 設在 23 行, 程式在執行到此行時會停下來
- Watch Variables 可以自行輸入要查看的 node、Global Variable、Global Table Value, 範例如下圖



The screenshot shows a debugger window titled "/Queue_End - OnEntry". The "Watch Variables" tab is selected and contains a single entry: "getlabelnum("Each_Patient_Wait_Time", n, 4) 0". The main code window shows the following code:

```
2 treenode item = parnode(1);
3 treenode current = ownerobject(c);
4 int port = parval(2);
5
6
7 int n = getinput(current); //ith patient
8 double arrive_system_time = getlabelnum(item, "arrive_system");
9 double leave_system_time = getlabelnum(item, "leave_system");
10 double wait_time_in_system = leave_system_time - arrive_system_time;
11 double arrive_doc_time = getlabelnum(item, "arrive_doc_query");
12 double leave_doc_time = getlabelnum(item, "leave_doc_query");
13 double wait_time_in_query = leave_doc_time - arrive_doc_time;
14
15 // Set Each_Patient_Wait_Time Table
16 settablenum("Each_Patient_Wait_Time", n, 1, arrive_system_time);
17 settablenum("Each_Patient_Wait_Time", n, 2, leave_system_time);
18 settablenum("Each_Patient_Wait_Time", n, 3, wait_time_in_system);
19 if (wait_time_in_system > 150)
20 {
21     settablenum("Each_Patient_Wait_Time", n, 4, 1);
22 }
23 // Set Doctor_QueryTime Table
24 settablenum("Doctor_QueryTime", n, 1, arrive_doc_time);
```

Breakpoint

- Next Line: 逐行執行程式
- Step Into: 用來跳過一次迴圈
- Continue: 繼續執行程式, 直到下一次遇到 Breakpoint 才會停止
- Stop: 等同左上角之 Stop



- Debug 完成後, 再點一下 Breakpoint 取消紅點