

- 至eCourse2課程網頁下載受測程式nsieve.c
- 利用gcc與 intel compiler 編譯該程式: (六種狀況)

```
$ gcc -DUNIX -g -O0 nsieve.c
```

```
$ gcc -DUNIX -g -O3 nsieve.c
```

```
$ icc -DUNIX -g -O0 nsieve.c
```

```
$ icc -DUNIX -g -Ofast nsieve.c
```

```
$ icx -DUNIX -g -O0 nsieve.c
```

```
$ icx -DUNIX -g -Ofast nsieve.c
```

利用VTune profiler (Linux version) 量測下列數據，**將你的答案適當的呈現**，並存成PDF檔格式，上傳到eCourse2

Deadline: October 31 (Tuesday), 24:00.

利用VTune profiler量測與分析程式:

- HotSpots analysis: (使用Hardware Event-Based Sampling , CPU sampling interval: 1ms)

回覆下列問題:

- Q1: CPU型號、系統記憶體大小、作業系統版本、在實體機器或是虛擬機器上執行 (若是虛擬機器，請列出虛擬軟體的版本)?
- Q2: CPU time?
- Q3: Instructions retired?
- Q4: CPI?

- Q5: 將HotSpot分析後Summary的畫面(類似下面畫面)的截圖貼上

The screenshot displays the Intel VTune Amplifier 2019 interface. The top navigation bar includes 'Hotspots by CPU Utilization' and a 'Summary' tab. The main content area is divided into two sections: 'Elapsed Time' and 'Top Hotspots'. The 'Elapsed Time' section shows a total of 38.064s, with sub-metrics for CPU Time (278.902s), Instructions Retired (68,751,950,291), Microarchitecture Usage (9.1% of Pipeline Slots), CPI Rate (5.903), Total Thread Count (11), and Paused Time (0.427s). The 'Top Hotspots' section lists the most active functions, with 'multiply1' being the most significant at 276.546s. A right-hand sidebar titled 'Hotspots Insights' provides additional context and links to further analysis tools.

Intel VTune Amplifier 2019

Hotspots by CPU Utilization

Analysis Configuration Collection Log **Summary** Bottom-up Caller/Callee Top-down Tree Platform multiply.c x multiply.c x

Elapsed Time: 38.064s

- CPU Time**: 278.902s
 - Instructions Retired: 68,751,950,291
- Microarchitecture Usage**: 9.1% of Pipeline Slots
 - CPI Rate: 5.903
 - Total Thread Count: 11
 - Paused Time: 0.427s

Top Hotspots

This section lists the most active functions in your application. Optimizing these hotspot functions typically results in improving overall application performance.

Function	Module	CPU Time
multiply1	matrix.exe	276.546s
func@0x1401c7ad0	ntoskrnl.exe	0.936s
BaseThreadInitThunk	kernel32.dll	0.830s
func@0x1401c2db0	ntoskrnl.exe	0.087s
KeClockInterruptNotify	ntoskrnl.exe	0.078s
[Others]		0.426s

**N/A is applied to non-summable metrics.*

Hotspots Insights

If you see significant hotspots in the Top Hotspots list, switch to the [Bottom-up](#) view for in-depth analysis per function. Otherwise, use the [Caller/Callee](#) view to track critical paths for these hotspots.

Explore Additional Insights

Microarchitecture Usage : 9.1%
Use [Microarchitecture Exploration](#) to explore how efficiently your application runs on the used hardware.

Vector Register Utilization : 25.0%
Use [Intel Advisor](#) to learn more on vectorization efficiency of your application.