

電機資訊工程實習期末考

1. What are the major differences between wireless LANs and PANs?
2. In wireless networks, please briefly describe the major technical differences between 1G, 2G, and 3G systems.
3. Explain what is an IP core and its role in modern VLSI system design.
4. What is difference between a Fabless company and an IDM company?
5. What is an embedded system? Is google an embedded system? How about an air conditioner?
6. What is the design process of an embedded system?
7. 何謂 NP(Network Processor)?請簡述其用途?
8. 請列舉並簡述三種網路攻擊方式?
9. Let the image size be 160 by 160 pixels. The image is divided into non-overlapped blocks, where the block size is 16 by 16 pixels. Then Motion Estimation is performed on each 16 by 16 block with search range [-15, 15]. If the accuracy of motion estimation is integer pixel, what are the total operations to perform FullSearch over the whole image? Does the block size have any effect on the number of operations?
ps. Assume the Motion Vector can point outside the image boundary.

10.

Spatial_domain_pattern:

```
{ 2560,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
  0,0,0,0,0,0,0,0,0,0,
}
```

請利用以下的 1D-N-point DCT 公式來算出上面矩陣經過 2D-8*8 DCT 轉換後 matrix 的 DC 值(也就是最左上角的值)。

以下為 1D-N-point DCT 公式:

$$t_k = \sum_{n=0}^{N-1} u_{k,n}^* s_n = \alpha(k) \sum_{n=0}^{N-1} s_n \cos \frac{(2n+1)k\pi}{2N}$$

$$\alpha(k) = \begin{cases} \sqrt{\frac{1}{N}} & k=0 \\ \sqrt{\frac{2}{N}} & k=1,2,\dots,N-1 \end{cases}$$

11. 請回答本學期出席之情形。例如：全勤或缺課 xx 次。
12. 請分別就 CPU 及通訊元件說明為什麼未來硬體設計的要求會愈來愈高頻。