

考試科目	計算機概論	系別	資訊科學系碩士在職專班 A821	考試時間	2 月 24 日(日) 第四節
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There are nine questions in this exam. The weights for each question are indicated at the end of each question. Please do all of them. All questions must be answered in English or Chinese. For each question, please limit your answer in 500 words.

1. How does a CPU (Central Processing Unit) operate? (10%)
2. How does a cache operate? (10%)
3. Please compare TCP (Transmission Control Protocol) with UDP (User Datagram Protocol). (10%)
4. Please compare the client-server network model with the peer-to-peer network model? (10%)
5. What is software engineering? (10%)
6. What is a relational database? (10%)
7. What are the three main design principles of object-oriented programming? (10%)
8. We define the factorial function $f(n)$ as $f(n)=n \times f(n-1)$ and $f(0)=1$ for a positive integer n . Please implement the factorial function in C. First write a recursive version and then write a non-recursive version. (15%)
9. Please rewrite the following C code so that the *main* function can use the *swap* function to swap values of a and b . (15%)

```
void swap(int a, int b)
{
    int temp;
    temp = b;
    b = a;
    a = temp;
}
```

```
int main()
{
    int a = 10;
    int b = 20;
    swap(a, b);
}
```