1. 試扼要說明電腦之中央處理單元(Central Processing Unit)運作的概況，文
必須提到下列物件配合說明：
  ➢ 算術邏輯單元(Arithmetic Logic Unit)
  ➢ 控制單元(Control Unit)
  ➢ 輸入/輸出單元(Input/Output Unit)
  ➢ 累加器(Accumulator)
  ➢ 狀態指示器(Condition code register)
  ➢ 指令位址暫存器/Instruction on address register)
  ➢ 主記憶體(Main memory)
  
2. 若以 8 個位元儲存一個整數 且負值採用二進位 2 的補數表示法
(2's Complement)，試寫出十進位值減法
(51)_{10} - (30)_{10} 之二進位運算過程。 

3. 試述如何運用「二分搜尋法(Binary search)」自下列電話資料中，找出 Kevin
及 Mary 的電話號碼：

<table>
<thead>
<tr>
<th>人名</th>
<th>電話號碼</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peter</td>
<td>5118999</td>
</tr>
<tr>
<td>Steve</td>
<td>5840212</td>
</tr>
<tr>
<td>Kevin</td>
<td>3128846</td>
</tr>
<tr>
<td>Joy</td>
<td>5201233</td>
</tr>
<tr>
<td>William</td>
<td>8215224</td>
</tr>
<tr>
<td>Vivic</td>
<td>4201586</td>
</tr>
</tbody>
</table>

4. 某些高級的筆記型電腦標榜的「內建獨立顯示卡」是何意念？

5. 何謂 RSS？那種類型的網站會提供這種服務？

6. 網頁瀏覽之 Cookies 是作何用途？

7. 壓縮軟體 (如 WinZip, WinRAR)有何用途？
8. Give short descriptions of the following terms: (10% = 2% * 5)
   (a) Disk Array; (b) IPv6; (c) Neural Network; (d) Public Key and Private Key;
   (e) Cookies stored by web browsers.

9. Explain what RFID (Radio Frequency Identification) is and give its potential applications in logistics and supply chain management. (6%)

10. On an LCD panel there are several defect spots, which can be repaired using laser beams. The time needed to repair each spot is so short that it can be ignored. However, it takes time to move the laser gun’s focus from one spot to another one, and the time required depends on the distance between the two spots. Assume the (x-y) coordinates of all spots are known in advance. We want to write a program to produce a sequence of the spots such that we can repair all spots in the shortest time. Give the relationship between this problem and the Traveling Salesperson Problem. (5%)


12. The Fibonacci sequence starting from 0 is recursively defined as follows: $f(0) = 0$, $f(1) = 1$, and $f(n) = f(n-1) + f(n-2)$ for $n \geq 2$. Write, in pseudo codes, a program that takes non-negative integer $n$ as the input and reports Fibonacci number $f(n)$. The run time required by your program should be as small as possible. (4%)
13. Write a program, in any familiar program language or pseudo codes, that can read
   in a file "test.data", in which many scores of students are stored, from disc drive A.
   The program can output some statistical data of this file.
   (a) The median, and
   (b) The mode.
   Write down proper comments in your program.

14. Given an integer number N. If N is not a prime number, then the program can
   print out its integer factor, else print out N is a prime number.
   Write a program, in any programming language or pseudo codes.
   Write down proper comments in your program.