系所組別： 醫學工程研究所乙組
考試科目： 計算機概論　　　　　　　　　　　　　考試日期：0307，節次：2

※ 考生請注意：本試題 ☑可　□不可 使用計算機

1. (20 %) Please briefly describe and compare the following terms:
(a) HyperText Markup Language (HTML) vs. Extensible Markup Language (XML)
(b) Firmware vs. Software
(c) Augmented reality (AR) vs. Virtual reality (VR)
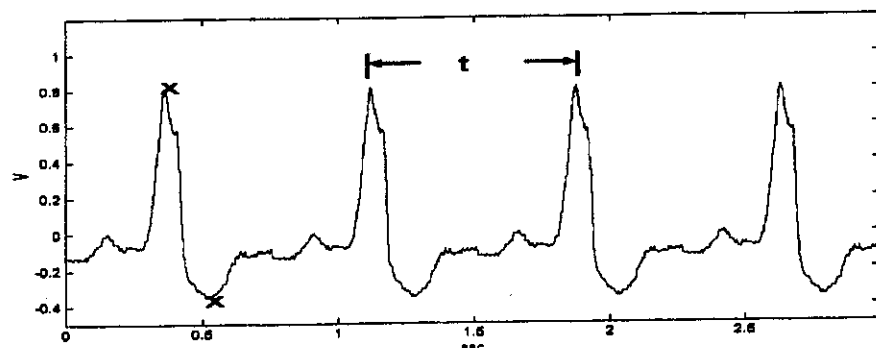(d) Huffman code vs. Cyclic redundancy check (CRC)

2. (15 %) The following is a clip of sentence from an article "Current development of wireless communication scheme can provide a secure <u>computer networking gateway</u>, <u>firewall</u>, <u>dynamic host configuration protocol (DHCP) server</u>, <u>intrusion detection system</u> functions." Could you explain the meanings of the underlined terms?

3. (15 %) What are (a) querying, (b) scanning, (c) browsing, (d) sorting, (e) searching generally used in database management or bioinformatics?

4. (20 %) Figure 1 is a trace of electrocardiography (ECG), a signal measured from human heart reflecting the hear beat. Assume that that the signal has been digitized via a 12-bit analogue to digital converter (AD C) at a full-scale of ± 5V with a sampling rate of 1 kHz. The data are stored in an ASCII file format.
(a) Could you determine the amplitude resolution and quantization error of this ECG data acquisition system?
(b) Could you write a program using your familiar programming language (or pseudo codes) to determine the peak-to-peak interval (t) and convert it to instantaneous hear rate in terms of beats per minute (BPM).
(c) Could you also define the rising rate of QRS which is the peak-to-peak amplitude (between two x's) divided by the time duration?
(d) Draw a flowchart to describe your algorithm. You can give any assumptions if you wish.

(Fi gure 1)

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5. (15 %) Please write a function (or subroutine) using your familiar programming language (or pseudo codes) to generate 6 numbers out of 49 similar to a lottery drawing machine (大樂透). Assume that a function 'rand' has been given which can generate a random number of uniform distribution between 0 and 1. Be sure that the drawing numbers shall not repeat.

6. (15 %) Could you make comparison among recent communication technologies of Wi-Fi, mobile 3G networks and WiMAX (Worldwide Interoperability for Microwave Access)?