

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. (13%) Use an example to explain what 'recursion' is in a computer program. Also, explain why sometimes it is helpful to use recursion in coding.
2. (20%) Write a program to list all prime numbers within 10000. You may use C, C++ or pseudocode.
3. (20%) Name two potential applications in biomedical engineering that artificial intelligence (AI) may be applied for. Explain why AI would be helpful for those applications.
4. (20%) You work for a company that specializes in database design. Recently, your company has accepted a case that plans to build a new hospital. Your boss assigns this project to you, and your responsibility is to plan for the medical database for this new hospital. Name at least three factors that are critical to consider when laying out the plans for such a database. Also explain why they are critical factors to consider.
5. (21%) Explain those terms for the floating point conversion (such as integer to IEEE 32-bit):
 - (1) Overflow
 - (2) Underflow
 - (3) Truncation error
6. (6%) When storing signed integers, it is preferred to use two's complement than sign-and-magnitude representation. Why?