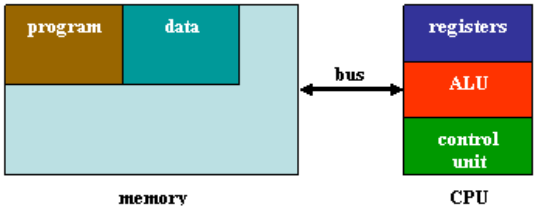
104 學年 第一學期 資訊一甲
計算機概論 第二次平時考試
學號：　　姓名：Solutions

1. (25 points) 何謂 von Neumann architecture? 簡單說明其特性。(What is von Neumann architecture? Give a brief explanation of its characters.)
   Most modern computers store data and programs in memory. Computers of this model are called stored-program computers and is also called von Neumann architecture originally devised by John von Neumann. The block diagram of a von Neumann architecture is composed of a memory and a central processing unit (CPU) which are connected by a bus.



2. (25 points) 程式的變數 (program variable) 有哪六個屬性 (attributes)? 解釋他們的意義。(What are the six attributes of a program variable? Explain the meaning of each term.)
   A program variable is characterized with six attributes:
   1. Name: the identifier of a variable,
   2. Location: also known as address, the memory address of a variable,
   3. Value: the content of a variable's memory location,
   4. Type: the data type of a variable,
   5. Scope: the program context that a variable is visible, and
   6. Lifetime: the period of execution time when a variable is bound to a memory location.

3. (25 points) 使用 C 語言定義的算術運算優先順序和結合律，並假設二元運算的運算元評估順序是*由左而右*，從 1 到 17，填入下列算術式運算子和運算元的評估順序。(Use the precedence rules and associative rules of C language. Also, suppose the operands of a binary operation are evaluated ***from left to right***. Fill in the evaluation orders, from 1 to 17, of all operators and operands of the following arithmetic expression.)

u	*	v	%	w	+	x	/	y	–	r	/	s	%	t	*	q
1	3	2	5	4	9	6	8	7	17	10	12	11	14	13	16	15

4. (25 points) 使用 C 語言定義的算術運算優先順序和結合律，並假設二元運算的運算元評估順序是*由右而左*，重寫下列的設定句以移除其中副作用的式子；你可自訂及使用其他的變數。(Use the precedence rules and associative rules of C language. Also, suppose the operands of a binary operation are evaluated ***from right to left***. Rewrite the following assignments to remove side effect in the expressions. You may define and use other variables.)

   d = ++a + a++ * b-- * ++c;

   c = c + 1;
   temp = b * c;
   b = b – 1;
   temp = a * temp;
   a = a + 1;
   a = a + 1;
   d = a + temp;