科目： 計算機概論（含資料結構） 第一頁 共二頁

Note: 1. You can write down your answers in English or Chinese（你可以用中文書寫或英文書寫來回答問題）
2. 請依序將答案填寫在答案紙中

1. (6%) Convert the following hexadecimal numbers to octal without using a calculator, showing your works:
   1.1 $(51A)_{16}$
   1.2 $(4E1)_{16}$
   1.3 $(BB.C)_{16}$

2. (4%) Check the following information of networks and find out the correct netmask settings (e.g, 255.255.0.0):
   2.1 Address: 140.115.50.0 ,Maximum subnets: 256
   2.2 Address: 140.115.51.0 ,Maximum subnets: 4096

3. (10%) Explain the following concepts of computer networks:
   3.1 Define source-to-destination delivery. In which layer does this type of delivery take place?
   3.2 Explain the difference between an MAC address and an IP address.

4. (10%) What is the difference between a job scheduler and a process scheduler?

5. (10%) Distinguish between public and private key in asymmetric-key cryptography.

6. (10%) Distinguish between the waterfall model and the incremental development model.

7. (10%) Please draw the corresponding tree as follow:
   7.1 A binary search tree for the months of the year.
   7.2 A balanced the binary search tree for the months of the year.

8. (10%) Consider the following weighted graph.
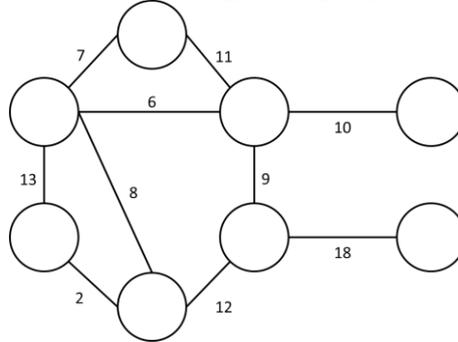
8.1 Give a Minimum Spanning Tree of the above graph.
8.2 Does the above graph have a unique minimum spanning tree?
Explain your answer, please.

9. (10%) Write a recursive function

    factorial(int n)

that, when invokes, returns *n!*. For example, factorial(5) = 5*4*3*2.
(You are asked to write the program in a formal format, which should be
very similar to C, C++, Python, or Java programming)

10.(10%) Write a program that displays all the prime numbers less than 120
in decreasing order.

11.(10%) Give a binary tree shown as follow, answer the corresponding
sequences and draw the binary trees.
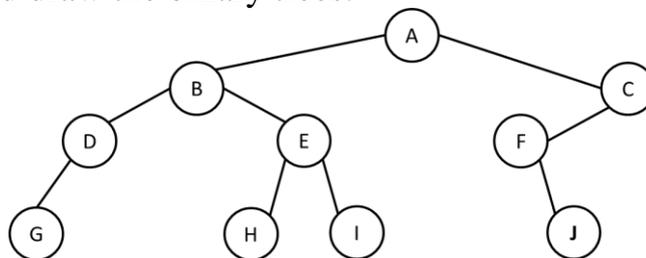
11.1 Pre-order traversal.
11.2 Post-order traversal.