作业 2

第一题：

8. (a) What are the advantages of Adaptive Huffman Coding compared to the original Huffman Coding algorithm?

   (b) Assume that Adaptive Huffman Coding is used to code an information source S with a vocabulary of four letters (a, b, c, d). Before any transmission, the initial coding is a = 00, b = 01, c = 10, d = 11. As in the example illustrated in Fig. 7.8, a special symbol NEW will be sent before any letter if it is to be sent the first time.
   Figure 7.18 is the Adaptive Huffman tree after sending letters **aabb**. After that, the additional bitstream received by the decoder for the next few letters is 01010010101.

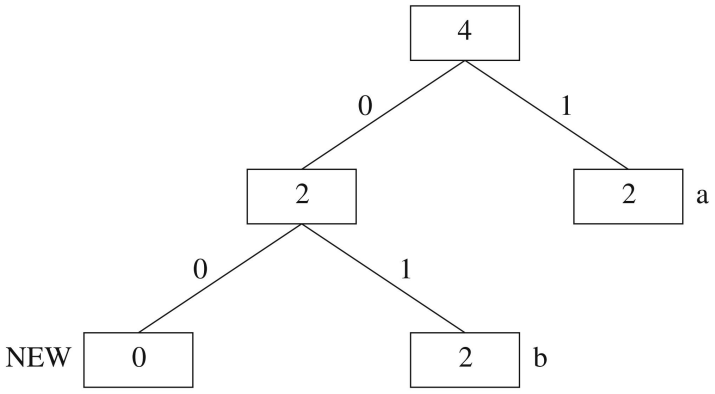

Fig. 7.18 Adaptive Huffman tree

   i. What are the additional letters received?
   ii. Draw the adaptive Huffman trees after each of the additional letters is received.

(a) 部分（40%），要求给出完整的回答

(b) i 部分（20%），要求给出推导的过程，缺少过程，将扣除一半的分值。

(c) ii 部分（40%），要求给出推导的过程，缺少过程，将扣除一半的分值。

第二题：

. You are given a computer cartoon picture and a photograph. If you have a choice of using either JPEG compression or GIF, which compression would you apply for these two images? Justify your answer.

（必须使用本作业提供的图片(动物卡通图片和动物照片)，其他图片无效）

理论原因分析部分（40%），给出你做出选择的原因的解释，包括不同格式图像数据、不同格式图像的编码方法等对比。

程序实现部分（40%）：仅要求实现 JPEG 的压缩算法，需要独立编程实现 JPEG 压缩过程的

重要模块（如颜色转换+色度二次采样，二维 DCT 变换，量化， DPCM 和 游长编码， 熵编码等），附上源代码（编程软件不限）；GIF 图像格式可直接用现有软件。
结果对比部分（20%）：JPEG 和 GIF 图像格式的视觉效果和压缩效果比较（包括压缩率的比较和失真度的比较，各占 10%）。