1. A program runs in 10 seconds on computer A, which has a 400-MHz clock. We are trying to help a computer designer build a machine, B, that will run this program in 5 seconds. The designer has determined that a substantial increase in the clock rate is possible, but this increase will affect the rest of the CPU design, causing machine B to require 1.2 times as many clock cycles as machine A for this program. What clock rate should we tell the designer to target? (15%)

2. Control is the most challenging aspect of processor design. It is both the hardest part to get right and the hardest part to make fast. One of the hardest parts of control is implementing exceptions and interrupts — events other than branches or jumps that change the normal flow of instruction execution. Please briefly describe how the exceptions are handled. (15%)

3. Please explain the following two misses in a memory:
   (a) compulsory misses (10%), (b) conflict misses (10%).

4. Explain the time complexity for each of the following sorting methods:
   (a) Insert sort (3%)
   (b) Quick sort (3%)
   (c) Merge sort (3%)
   (d) Heap sort (3%)
   (e) Selection sort (3%)

5. Give a min heap tree and a max heap tree, respectively, by inserting the following sequence of numbers: 78, 48, 9, 11, 71, 51, 63, 18, 25, 33. (20%)

6. For the following binary tree, give its related infix, prefix and postfix by using traversal. (15%)

   ![Figure of problem 6](image_url)