Solutions to Homework -10

Problem-1: Reversed polished notation: 52x7+42/1+-
Generated code:
BIPUSH 5
BIPUSH 2
IMUL
BIPUSH 7
IADD
BIPUSH 4
BIPUSH 2
IDIV
BIPUSH 1
IADD
ISUB

Problem-2: It is essential when adding BCD numbers. While adding two numbers in 16-bit hex if we don’t have carry out bit, it will generate an erroneous result for BCD format. The carry out of 3 bit provides AAA instruction to check whether something went wrong.

Problem-3: 4 fields are needed: 2 operands, a condition and a branch address.

Problem-4: Following 3 steps in order is capable of interchanging 2 variables:
B=A XOR B
A=A XOR B
B=A XOR B

Problem-5: If 1 disk is read in 1 minute it will take $2^n - 1$ minutes to complete reading of 64 disks. Now for 64 disks, there are $2^{64} - 1$ moves are required.
Moreover, the same number of minutes is required to complete the job. Solving these for years, it will take about \(3.51 \times 10^{13}\) years.

Problem-6: It will take 8.192 sec to transfer 16K words at the rate of 16msec. It leaves 7.808 msec (16-8.192) per cycle. Therefore, CPU speed will be reduced by \(7.808/16=48.8\%\). And DMA will be responsible for 51.2% CPU slow down ultimately.