1. What does the following program do?

```
clear
load #10D
loop:
  add
  branch-if-not
  store $1234
```

**Calculates the summation 10+9+8...1 and stores it in $1234**

2. Assume that the contents of the accumulators and selected memory locations in a 68HC11 microprocessor are initially \([A]=12\), \([B]=2A\), \([0037]=46\) and \([1234]=27\). Which of them is affected and what is the new value after executing the following instructions, starting from the same initial values in each case? What addressing mode is used in each instruction?

   a. `inca` Only A is affected, \([A]=13\), inherent.
   b. `aba` Only A is affected, \([A]=3C\), inherent.
   c. `ldaa $1234` Only A is affected, \([A]=27\), extended.
   d. `ldab $37` Only B is affected, \([B]=46\), direct.
   e. `ldaa #$37` Only A is affected, \([A]=37\), immediate.
   f. `adda #10D` Only A is affected, \([A]=1C\), immediate.
   g. `oraa #$2A` Only A is affected, \([A]=3A\), immediate.
   h. `andb $1234` Only B is affected, \([B]=22\), extended.
   i. `eora #$42` Only A is affected, \([A]=50\), immediate.
   j. `stab $37` \([0037]\) is affected, \([0037]=2A\), direct.

3. What 68HC11 instruction will do each of the following? What is the addressing mode in each case?

   a. add the data from memory location $A2FF to accumulator A
      `adda $A2FF` extended 4 clock cycles - 500nsec
   b. store the data in accumulator B in memory location $0034
      `stab $34` direct 3 clock cycles - 375nsec
   c. decrement the contents of memory location $1234
      `dec $1234` extended 6 clock cycles - 750nsec
   d. add $36 to the contents of accumulator B
      `addb #$36` immediate 2 clock cycles - 250nsec
   e. clear bits 4 to 7 in accumulator A without affecting the other bits
      `anda #$0F` immediate
   f. complement bits 4 to 7 in accumulator A
      `eora #$F0` immediate
   g. Compare B with the contents of memory location $1234
      `cmpb $1234` extended
   h. Set bits 3 and 4 in accumulator B without affecting the other bits
      `orab #$18` immediate
   i. Set bit 4 of the operand stored in $0034 without affecting the other bits.
      `bset $34 $10` direct
4. How many clock cycles are required to fetch and execute each of the first 4 instructions in question 2 above? How long does it take to execute the instructions if the microprocessor operates at a clock frequency of 8 MHz?

See above