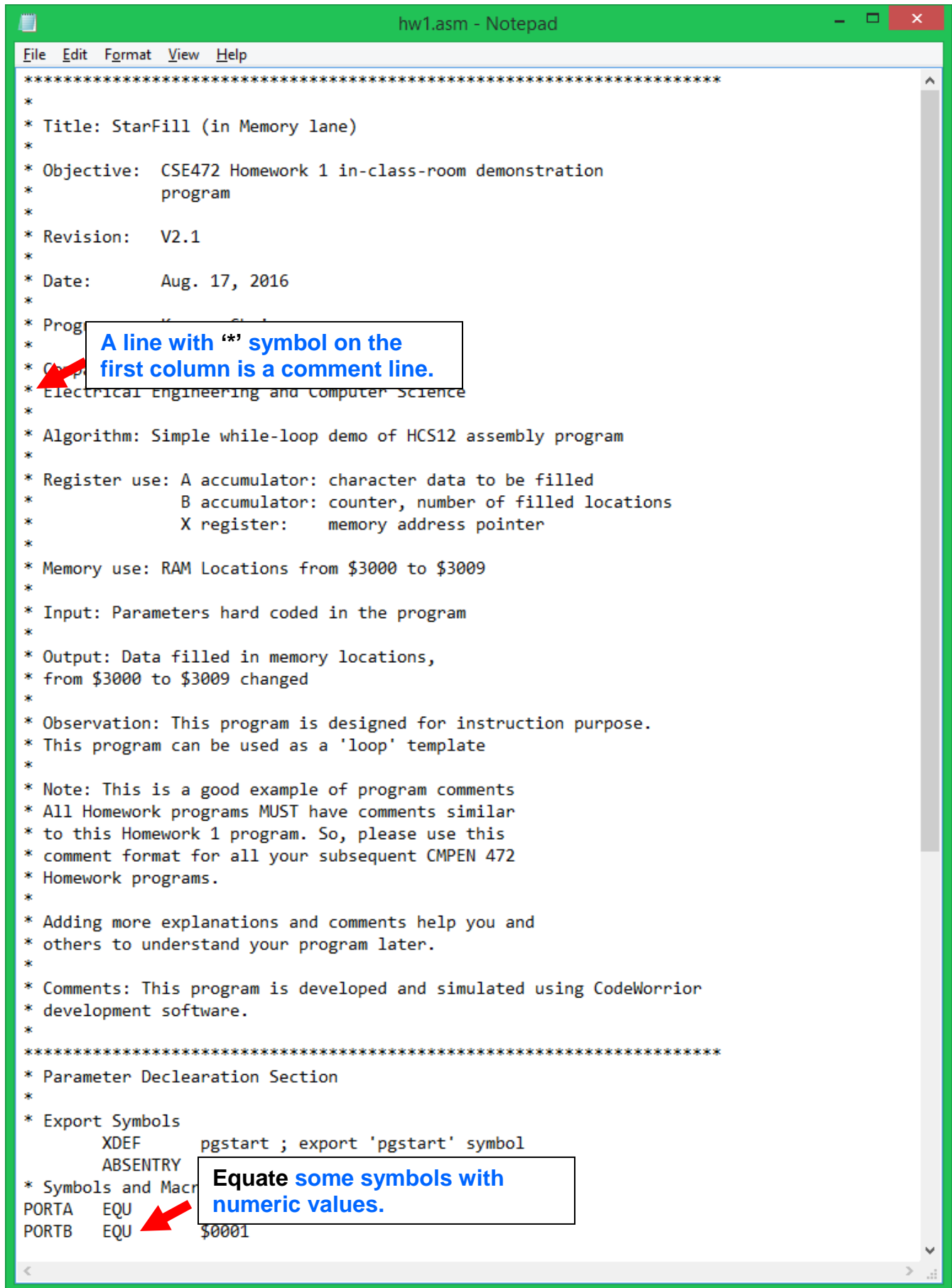


Homework 1 Aid

Understanding Homework 1 Program



```
*****
*
* Title: StarFill (in Memory lane)
*
* Objective: CSE472 Homework 1 in-class-room demonstration
*            program
*
* Revision:  V2.1
*
* Date:      Aug. 17, 2016
*
* Program:   StarFill
*
* Copyright 2016, Electrical Engineering and Computer Science
*
* Algorithm: Simple while-loop demo of HCS12 assembly program
*
* Register use: A accumulator: character data to be filled
*               B accumulator: counter, number of filled locations
*               X register:    memory address pointer
*
* Memory use: RAM Locations from $3000 to $3009
*
* Input: Parameters hard coded in the program
*
* Output: Data filled in memory locations,
*         from $3000 to $3009 changed
*
* Observation: This program is designed for instruction purpose.
* This program can be used as a 'loop' template
*
* Note: This is a good example of program comments
* All Homework programs MUST have comments similar
* to this Homework 1 program. So, please use this
* comment format for all your subsequent CMPEN 472
* Homework programs.
*
* Adding more explanations and comments help you and
* others to understand your program later.
*
* Comments: This program is developed and simulated using CodeWarrior
* development software.
*
*****
* Parameter Declaration Section
*
* Export Symbols
*       XDEF      pgstart ; export 'pgstart' symbol
*       ABSENTRY
*
* Symbols and Macros
* PORTA EQU
* PORTB EQU $0001
```

A line with '*' symbol on the first column is a comment line.

Equate some symbols with numeric values.

```
File Edit Format View Help
*
*****
* Parameter Declaration Section
*
* Export Symbols
    XDEF      pgstart ; export 'pgstart' symbol
    ABSENTRY  pgstart ; for assembly entry point
* Symbols and Macros
PORTA EQU     $0000 ; i/o port addresses
PORTB EQU     $0001
DDRA  EQU     $0002
DDRB  EQU     $0003
*****
* Data Section
*
    ORG      $3000 ;reserved memory starting address
here DS.B    $0A   ;10 memory locations reserved
count DC.B   $0A   ;constant, star count = 10
*
*****
* Program Section
*
    ORG      $3100 ;Program start address, in RAM
pgstart ldaa #'*' ;load '*' into accumulator A
    ldab     count ;load star counter into B
    ldx      #here ;load address pointer into X
loop    staa  0,x   ;put a star
    inx      ;point to next location
    decb     ;decrease counter
    bne      loop  ;if not done, repeat
done    bra   done  ;task finished,
           ; do nothing
*
* Add any subroutines here
*
    END          ;last line of a file
```

Number Notation: decimal, **hexa-decimal**, binary, others
\$ %

HC12 Memory Map: \$0000 -> \$FFFF, RAM, ROM(Flash), Port

HC12 Register Set: A, B, X, Y, CCR, SP, PC

HC12 Instruction Set: LOAD, STORE, BRANCH

HC12 Addressing Modes: #\$3000, \$3000, 0,x

HCS12 Microcontroller: S12CPU

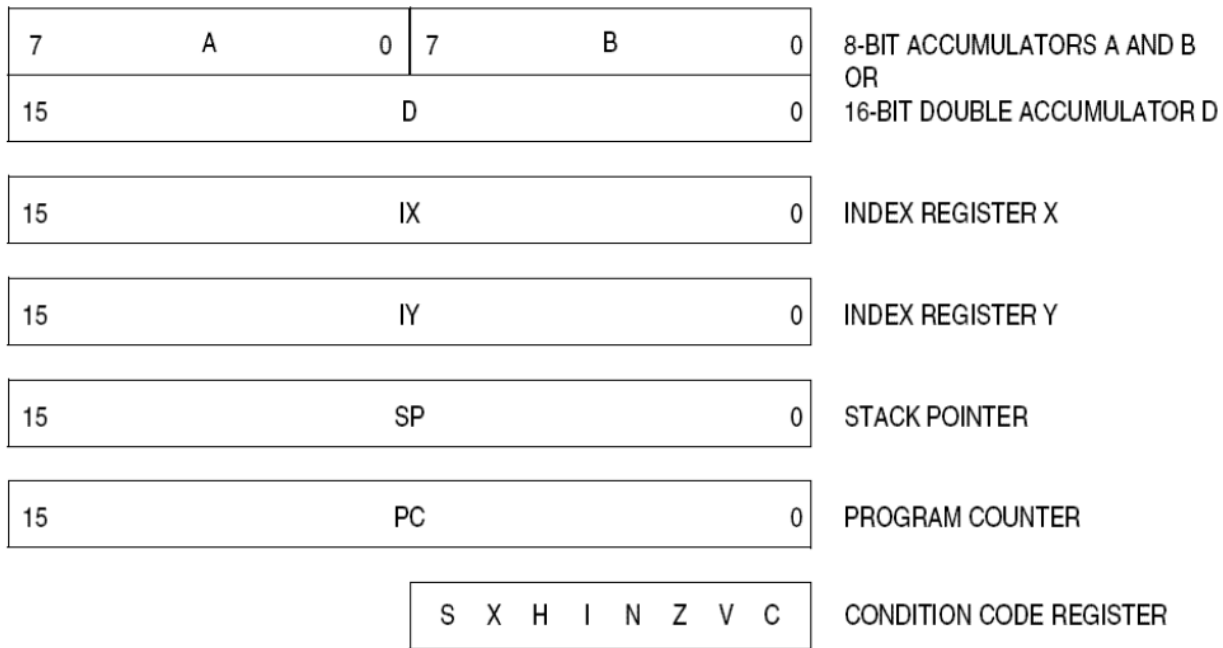


Figure 2-1. Programming Model

Program Flow Chart: Top-down approach, helps quickly design program, and helps program understanding.