An assignment for chapter one

Write a program to evaluate the arithmetic statement:

$$X = \frac{A-B+C*(D*E-F)}{G+H*K}$$

a)Using a general register computer with three address instructions

b)Using a general register computer with two address instructions

c)Using an accumulator type computer with one address instructions

d)Using a stack organizer computer with zero-address operation instructions.

Examples

Write a program to evaluate the arithmetic statement:

$$X = \frac{A - B + C * (D * E - F)}{G + H * K}$$

a. Using a general register computer with three address instructions.

b. Using a general register computer with two address instructions.

c. Using an accumulator type computer with one address instructions.

d. Using a stack organized computer with zero-address operation instructions.

a) Three address instructions:

SUB R1, A, B	R1←M [A] - M [B]
MUL R2, D, E	R2←M [D] * M [E]
SUB R2, R2, F	R2← R2 – M [F]
MUL R2, R2, C	R2← R2*M [C]
ADD R1, R1, R2	R1← R1+R2
MUL R3, H, K	R3← M [H] + M [K]
ADD R3, R3, G	R3← R3+ M [G]
DIV X, R1, R3	X← R1/R3

b) Two address instructions:

MOV R1, A	R1←M [A]
SUB R1, B	R1←R1-M [B]
MOV R2, D	R2←M [D]
MUL R2, E	R2←R2*M [E]
SUB R2, F	R2←R2 – M [F]
MUL R2, C	R2←R2*M[C]
ADD R1, R2	R1←R1+R2
MOV R3, H	R3←M [H]
ADD R3, G	R3←R3+M [G]
DIV R1, R3	R1←R1/R3
MOV X, R1	M[X]←R1

c) One Address instructions:

LOAD A	AC← M [A]
SUB B	AC←AC-M [B]
STORE T	M [T]←AC
LOAD D	AC←M [D]
MUL E	AC←AC*M [E]
SUB F	AC←AC-M [F]
MUL C	AC←AC*M[C]
ADD T	AC←AC+M [T]
STORE T	M [T]←AC
LOAD H	AC←M [H]
MUL K	AC←AC*M [K]
ADD G	AC←AC+M [G]
STORE T1	M [T1]←AC
LOAD T	AC←M [T]
DIV T1	AC←AC/M [T1]
STORE X	M[X]←AC

d) Zero address instructions:

RPN: AB-CDE*F-*+GHK*+/

PUSH A	TOS←A
PUSH B	TOS←B
SUB	TOS←(A-B)
PUSH C	TOS←C
PUSH D	TOS←D
PUSH E	TOS←E
MUL	TOS← (D*E)
PUSH F	TOS← F
SUB	TOS←((D*E)-F)
MUL	TOS←C*((D*E)-F)
ADD	TOS←((A-B)+ C*((D*E)-F)
PUSH G	TOS← G
PUSH H	TOS←H
PUSH K	TOS←K
MUL	TOS←(H*K)
ADD	TOS←G+(H*K)
DIV	TOS←((A-B)+ C*((D*E)-F)/(G+(H*K))
POP X	M[X]←TOS