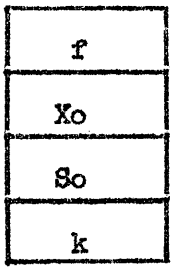
UNIVERSITY OF ILLINOIS

DIGITAL COMPUTER LABORATORY

NEW COMPUTER LIBRARY ROUTINE E1-D1VF-32

TITLE:	divided differences
TYPE:	closed, relocatable, mnemonic
LENGTH:	14 words
TEMPORARY STORAGE:	3 words of fixed memory locations 0, 1, 2 a block of (k+1) consecutive locations beginning at So
SUBROUTINES USED:	none
DURATION:	dependent on the duration of the auxiliary routine for evaluating the function f(x). The auxiliary is entered (k+1) times
FAST REGISTERS CHANGED:	none
PARAMETERS:	link in M15 4 parameters which have to be written in the word following the one with the JSB instruction:



address of auxiliary for f(x)

address of first abscissa

address of first location of temporary storage block

k-th divided difference

USE: The user must provide:

1) k+1 abscissas $X_0, X_1, X_2, \ldots, X_k$

in locations $X_0, X_0+1, \ldots, X_0+k$

2) An auxiliary routine for evaluating a function f(x), beginning at location f.

3) A block of k+1 consecutive words beginning at location So.

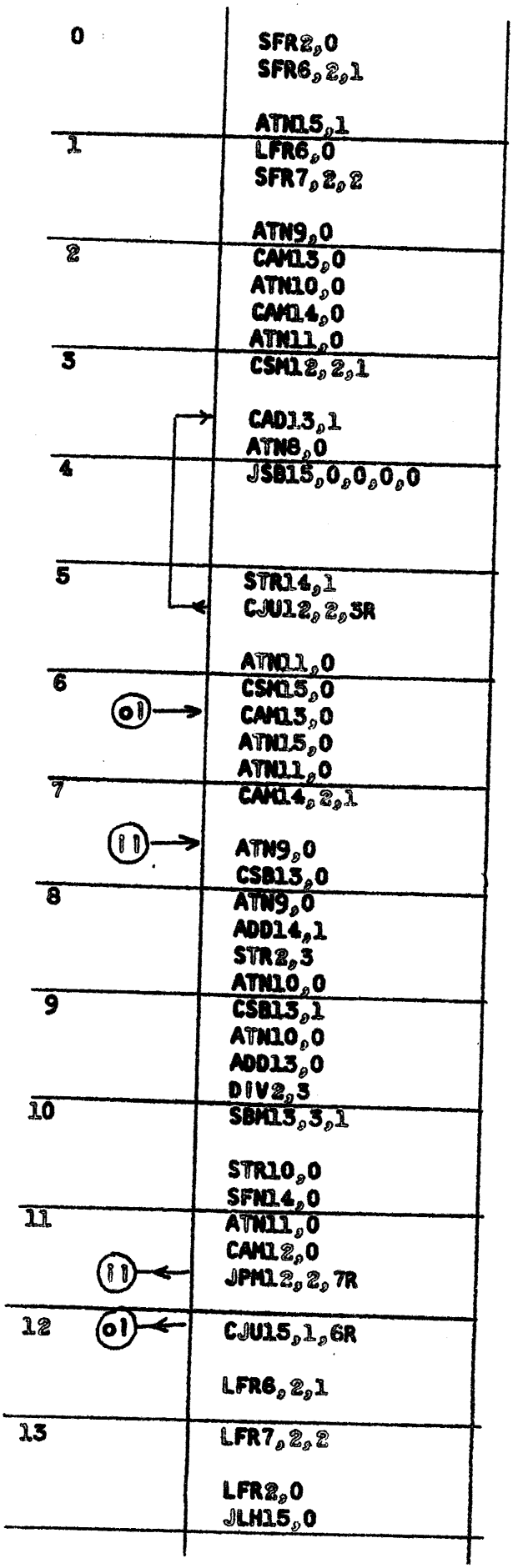
The subroutines computes a divided difference table and stores:

k-th	divided difference	$f[x_0, \ldots, x_k]$	in location So
(k-1)st	divided difference	$f[x_1, \ldots, x_k]$	in location So+1
(k-2)nd	divided difference	$f[x_2, \ldots, x_k$-	in location So+2
	⋮		
1st	divided difference	$f[X_{k-1}, X_k]$	in location So+k-1
the value of the function		$f(X_k)$	in location So+k

The k-th divided difference $f[x_0, x_1, \ldots, x_k]$ is also left in the accumulator.

DATE: December 21, 1962

PROGRAMMED BY: J. Nievergelt



read parameters into F6

(M14) ← S_0

(M12) ← − (k + 1)

fill up $S_0, S_1, \ldots, S_k$
with $f(x_0), f(x_1), \ldots, f(x_k)$

(M15) ← −k

(M14) (M11) + (M15) + 1