11. FUNCTION POINTERS

Hengfeng Wei (魏恒峰)

hfwei@nju.edu.cn

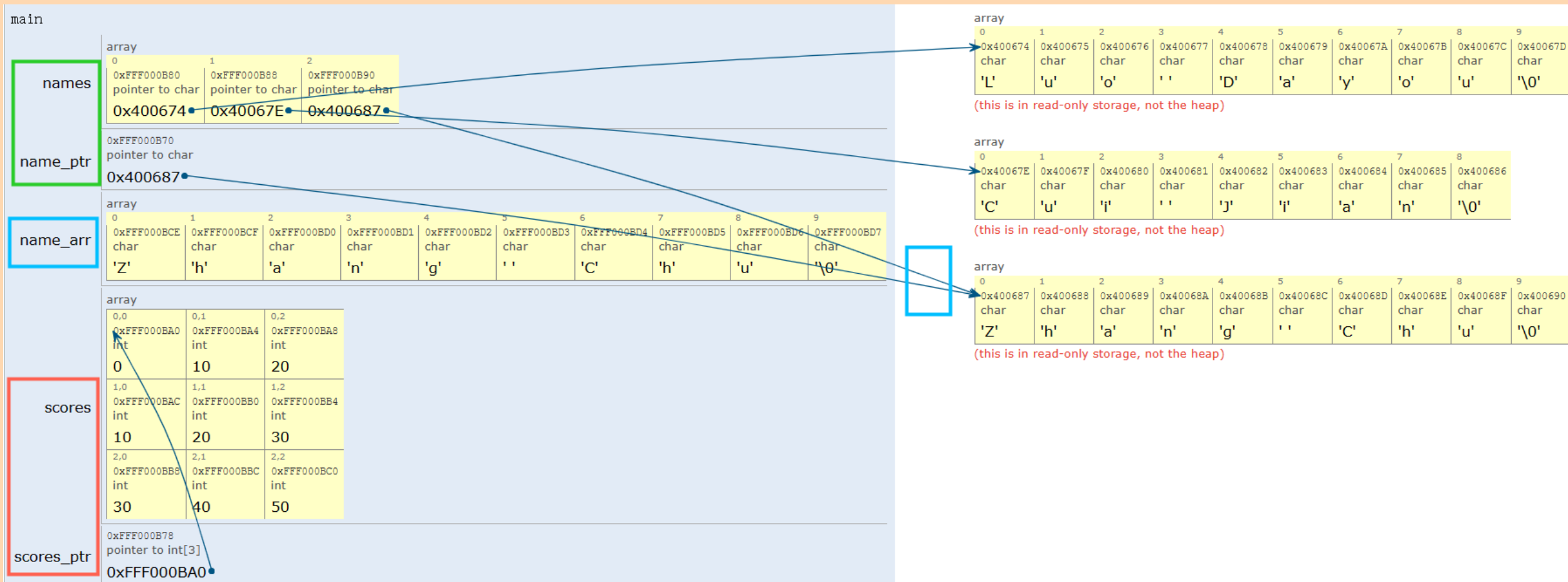Dec. 15, 2023

Review

Pointer Arrays (`char *names[]`)

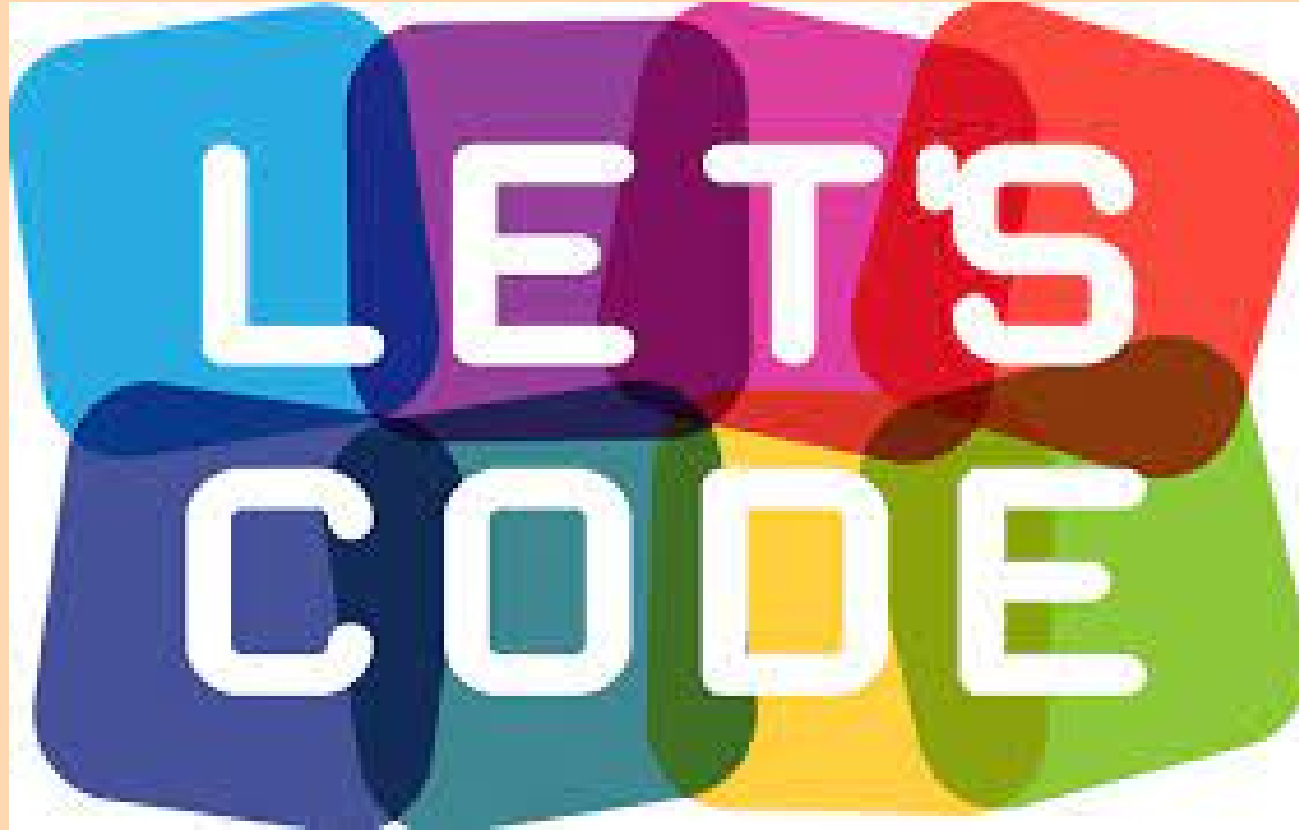**Pointers and 2D Arrays** (`int (*scores)[]`)

main

names

name_ptr

name_arr

scores

scores_ptr

array

0	1	2
0xFFF000B80	0xFFF000B88	0xFFF000B90
pointer to char	pointer to char	pointer to char
0x400674	0x40067E	0x400687

0xFFF000B70
pointer to char
0x400687

array

0	1	2	3	4	5	6	7	8	9
0xFFF000BCE	0xFFF000BCF	0xFFF000BD0	0xFFF000BD1	0xFFF000BD2	0xFFF000BD3	0xFFF000BD4	0xFFF000BD5	0xFFF000BD6	0xFFF000BD7
char	char	char	char	char	char	char	char	char	char
'Z'	'h'	'a'	'n'	'g'	' '	'C'	'h'	'u'	'\0'

array

0,0	0,1	0,2
0xFFF000BA0	0xFFF000BA4	0xFFF000BA8
int	int	int
0	10	20
1,0	1,1	1,2
0xFFF000BAC	0xFFF000BB0	0xFFF000BB4
int	int	int
10	20	30
2,0	2,1	2,2
0xFFF000BB8	0xFFF000BBC	0xFFF000BC0
int	int	int
30	40	50

0xFFF000B78
pointer to int[3]
0xFFF000BA0

array

0	1	2	3	4	5	6	7	8	9
0x400674	0x400675	0x400676	0x400677	0x400678	0x400679	0x40067A	0x40067B	0x40067C	0x40067D
char	char	char	char	char	char	char	char	char	char
'L'	'u'	'o'	' '	'D'	'a'	'y'	'o'	'u'	'\0'

(this is in read-only storage, not the heap)

array

0	1	2	3	4	5	6	7	8
0x40067E	0x40067F	0x400680	0x400681	0x400682	0x400683	0x400684	0x400685	0x400686
char	char	char	char	char	char	char	char	char
'C'	'u'	'i'	' '	'J'	'i'	'a'	'n'	'\0'

(this is in read-only storage, not the heap)

array

0	1	2	3	4	5	6	7	8	9
0x400687	0x400688	0x400689	0x40068A	0x40068B	0x40068C	0x40068D	0x40068E	0x40068F	0x400690
char	char	char	char	char	char	char	char	char	char
'Z'	'h'	'a'	'n'	'g'	' '	'C'	'h'	'u'	'\0'

(this is in read-only storage, not the heap)

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Overview

Function Pointers

Why they say...

Functions are first class citizens?

args   **return vals**   **assignment**   **in array**

integrate.c   sort.c   bsearch.c

$$\int_a^b f(x)\mathrm{d}x \approx \sum_{i=0}^{n-1} f(x_i)\left(\tfrac{b-a}{n}\right)$$

$$a = x_0 < x_1 < \cdots x_i < \cdots < x_{n-1} < x_n = b$$

$$x_i = a + \tfrac{b-a}{n} \cdot i$$

decl.c