C Assignment 3

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01 (4 marks) See the following two statements.

int a[3] = {11, 22, 33};

int *pa = a;

Give the values of the following expressions.

*a = 11

*(a+2) = 33

*pa = 11

pa[1] =22

02 (6 marks) See the following two statements.

int m[4][4] = {{1,3,5,7}, {11,33,55,77}, {2,4,6,8}, {22,44,66,88}};

int (*parr)[4] = m; (note) this is a pointer to an array, because [] has precedence on *

Give the values of the following expressions.

**m = 1

*(*m+2) = 5

((m+1)+1) = 33

*(m[1]+2) = 55

(*(m+2))[3] = 8

(*(parr+3))[2] = 66

03 (6 marks) Suppose you are working on a 32-bit machine where the size of an int is FOUR bytes, the size of a char is ONE byte and the size of pointers is FOUR bytes. See the following statements.

char *pa[] = {"12", "34", "56"}; (note) array of pointers to char

int m[2][3] = {{1, 2, 3}, {4, 5, 6}}; (note) 2d array

int (*ppm)[2][3] = &m; (note) pointer to a 2d array

Give the values of the following expressions.

I used the lab pc's from VUW to gain the following values for the expressions.

sizeof(pa) = an array of size 3 of pointers to char = 24 bytes

sizeof(*pa) = a pointer to the first element of pa[] = 8 bytes

sizeof(**pa) = is '1', a single char = 1 byte

sizeof(ppm) = (*ppm)[2][3] is a pointer to a 2D array, the pointer ppm = 8 bytes

sizeof(*ppm) = (*ppm)[2][3] is a pointer to a 2D array, = 24 bytes

sizeof(**ppm)= (*ppm)[2][3] is a pointer to a 2D array, so 3 int = 12 bytes

04 (6 marks) Declare p.

int arr[];

int *arr[] -> array of pointers

int (*arr)[] -> pointer to array

p is a 5-element array of pointers to char.

char *p[5]

p is a pointer to a 10-element char array.

char (*p)[10]

p is a function that takes an int argument and returns a pointer to char.

char *(p(int))

p is a function that takes a char array and returns a pointer to int.

int *(p(char []))

p is a pointer to a function that takes two int arguments and returns a pointer to an int.

int *((*p)(int, int))

p is a function that takes no arguments and returns a pointer to a function that takes an int argument and returns a pointer to a 10-element int array.

int (*(*p(void)) (int)))[10]