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Lab Exercises – Lab 1 COS10007 – Developing Technical Software  
  
a/  
int a = 1 , b = 2 \*ptr;

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| A | 0x1000 | 1 |
| B | 0x1004 | 2 |
| Ptr | 0x1008 |  |

\*ptr = &b;

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| A | 0x1000 | 1 |
| B | 0x1004 | 2 |
| Ptr | 0x1008 | 0x1004 |

b/

int a =1 , b=2 ,\*ptr=&b

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| A | 0x1000 | 1 |
| B | 0x1004 | 2 |
| Ptr | 0x1008 | 0x1004 |

a = \*ptr;

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| A | 0x1000 | 2 |
| B | 0x1004 | 2 |
| Ptr | 0x1008 | 0x1004 |

c/

int a =1 , b = 2 , c= 5 , \*ptr=&c

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| A | 0x1000 | 1 |
| B | 0x1004 | 2 |
| C | 0x1008 | 5 |
| Ptr | 0x1010 | 0x1008 |

b = \*ptr

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| A | 0x1000 | 1 |
| B | 0x1004 | 5 |
| C | 0x1008 | 5 |
| Ptr | 0x1010 | 0x1008 |

d/  
int a =1 , b=2 , c=5, \*ptr

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| A | 0x1000 | 1 |
| B | 0x1004 | 2 |
| C | 0x1008 | 2 |
| Ptr | 0x101C | 0x1008 |

e/

double x = 15.6 , y = 10.2 , \*ptr\_1=&y , ptr\_2 = &x

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| X | 0x1000 | 15.6 |
| Y | 0x1008 | 25.2 |
| Ptr\_1 | 0x1010 | 0x108 |
| Ptr\_2 | 0x1018 | 0x100 |

f/

int w = 10 , x = 2 \*ptr\_2=&x

|  |  |  |
| --- | --- | --- |
| Variable | Memory Address | Value |
| W | 0x1000 | 10 |
| X | 0x1004 | -8 |
| Ptr\_2 | 0x1008 | 0x1004 |

2.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Address | 0x1000 | 0x1004 | 0x1008 | 0x100C | 0x1010 | 0x1014 | 0x1018 |
| Value | 2 | 4 | 5 | 8 | 10 | 32 | 78 |
| Index | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| G[0] | 0 | 4 | 8 | 12 | 16 | 20 | 24 |
| Ptr1 | Ptr1+0 | Ptr1+1 | Ptr1+2 | Ptr1+3 | Ptr1+4 | Ptr1+5 | Ptr1+6 |
| Ptr2 | Ptr2+0 | Ptr2+1 | Ptr2+2 | Ptr2+3 | Ptr2+4 | Ptr2+5 | Ptr2+6 |

a/ ‘\*g’ refers to the values at the fist element of the array, which is 2.

b/ “\*(g+1)” refer to the second element of the array which is 4.

c/ “g+1” refer to the first de-references of “g” which mean the first element of the array then +1 which result being equal to 3

d/ “(g+5)” refer to the value at the sixth element of the array which is 32.

e/ ‘\*ptr1’ refer to the value that pointer 1 is pointing to , which is the first element in the array which in this case is 2

f/ \*ptr2 refer to where the 2nd pointer is pointing to which is the fourth element of the array 8  
g/ \*(ptr1+1) refer to the value that is one element after the element that ptr1 is pointing to , which is the second element , being 4.  
h/ ptr2+2 refer to the two elements after element that pointer2 is pointing to , which is the 6th element being 32 in the array.

3.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Address | X[0][0] | X[0][1] | X[0][2] | X[0][3] | X[1][0] | X[1][1] | X[1][2] | X[1][3] |
| Value | 1 | 8 | 7 | 6 | 2 | 4 | -1 | 0 |
| Index | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|  | X[0] |  |  |  | X[1] |  |  |  |
|  | Xptr |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

a/ \*xptr – point to the first array which is 1

b/ \*(xptr+2) – point to the third element of the array which is 7

c/ \*xptr + 2 – mean you add 2 to the pointed value which is 3

d/ \*(xptr+1) + \*(xptr+3) – refer to adding value of 2nd and 4th of the array which is 8+6 = 14.

4.  
#include <stdio.h>

struct student

{

char name[10];

int marks[4];

};

int main()

{

FILE \*fp;

struct student s;

int i, j;

fp = fopen("grades.txt", "r");

if (fp == NULL)

{

printf("Error opening file\n");

return 1;

}

while (fscanf(fp, "%s", s.name) != EOF)

{

printf("Name: %s\n", s.name);

for (i = 0; i < 4; i++)

{

fscanf(fp, "%d", &s.marks[i]);

printf("Mark %d: %d\n", i+1, s.marks[i]);

}

printf("\n");

}

fclose(fp);

return 0;

}