**Systems and PDC: Game 3**

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Do not use your book or the Internet or another student. If you have questions, you can ask Richard.

1. [2] pointers (the following code will not compile, but assume it were written so that it did)

int a = 5  
int b = 6  
int \*ptr2 = &b

int \*ptr1 = ptr2

\*ptr1 = 7

ptr1 = &y;  
what is the value of \*ptr2? You must give some brief explanation for your answer

\*ptr2 points to the address of variable b.

1. [2] Arrays. Allocate an array of structs  
     
   struct student {

int age;  
 char\* name;  
};  
  
arr = malloc(100 \* sizeof(struct student))  
printf(“%p %l”, arr, sizeof(struct student))  
> 0xfffa20 16  
  
what is the output for   
printf(“%p”, &arr[16])  
explain briefly what you understand, even if you don’t know the answer

It prints the pointer which points to the address of arr[16].

1. [1] What is the role of %eax in the following instruction?  
   add $0x2, %eax  
     
   a) input only  
   b) output only  
   c) input and output
2. [2] How many cache misses would you expect from the following loop if the array arr[][] has never been referenced before in the code? Assume that a cache line is 64 Bytes, and an int is 4 Bytes.  
   int arr[1024][1024]  
   for (i=0; i<1024; i++) {  
    for (j=0; j<1024; j++) {  
    arr[i][j] += 5  
     
   It will be until the function can output the value of that index. (10242 / 5) \* 4 misses.
3. [2] explain the type (void \*)  
     
   It is a pointer that can point to multiple types.
4. (extra) Explain what the following instruction does  
     
   mov %rax, -0x8(%rbp)

It moves a value from the %rax register and puts it onto the top of the stack?