**CIS 241 Fall 2018**

**Homework 1 (4% of the final grade)**

**Due date: 11:00AM on October 15, 2018**

(Please submit your homework **in hard copy** in October 15’s class)

Maximum Points: 100

1. (15 points) Please indicate whether the following statements with question mark are allowed or not allowed. Please briefly explain the reasons.

int a[10];

a++; //?

**This is not allowed because when you create the integer array a[10], you are just creating a space in memory for the compiler to look. Incrementing “a” would throw an error because you would be asking the compiler to increment multiple memory spaces.**

int a[10], b[10];

a=b; //?

**This is allowed because you are just creating a memory space for the compiler to look. Assigning “b” to “a” is just telling the compiler to assign a the memory address that “b” used to have.**

int a[10];

int \*p=a;

p++; //?

**This is allowed because you are just assigning the first memory location that the variable “a” had to the pointer’s new memory location. Incrementing “p” at this point will just increment “p” to the next memory location.**

1. (20 points) What are the outputs for the following codes respectively? Please briefly explain why.

(a)

int a[] = {3, 6, 8};

int \*p = a;

printf(“%d %d %d %d\n”, (\*p) + 1, \*(p+1), 3 \* (\*(p+2)), 2 \* (\*(p + 1)) – 2);

**4 6 24 10**

**The first output is just adding 1 to the first value in that memory space of p.**

**The second output is just asking to display the second value in the memory location of p.**

**The third output is finding the second value in memory, which is 8, and multiplying it by 3 giving 24.**

**The fourth output is finding the second value from the memory location p, which is 6, adding 1 to it giving 7. Then you subtract 2 and multiply that value by 2 giving 10.**

(b)

char str[]=”system”, \*p;

p = str;

printf(“%c %s %s”, \*p, str, p+1);

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1. (15 points) Here is the code of a string function strcpy(). Please briefly explain why this strcpy() function can copy a string to another. You may provide an example to help you explain your idea.

char \*strcpy(char \*s1, register const char \*s2)

{

register char \*p = s1;

while(\*p++ = \*s2++)

;

return s1;

}

1. (20 points) Please answer the following questions respectively.

(a)

char \*p;

We have created a pointer *p* as shown above. How can we make this pointer *p* point to a string “abc”?

(b)

char s[4];

We have created a character array *s* as shown above. How can we store a string “abc” into array *s*?

1. (10 points) We have the following structure.

struct person //declare a structure type

{

double salary;

int age;

};

We also have the following code.

struct person p1;

struct person \*p2 = (struct person \*)malloc(sizeof(struct person));

(a)

If we want to assign 65432.1 to p1’s salary, what should be the correct statement?

(b)

If we want to assign 20 to p2’s age, what should be the correct statement?

1. (10 points) We have the following structure

struct LL

{

int data;

struct LL \*next;

};

We have two linked lists ***a*** and ***b*** (***a*** and ***b*** are the heads of these two linked lists respectively). Write a function ***concatenate(struct LL \*a, struct LL \*b)*** to concatenate linked list ***a*** and ***b*** with ***a*** as the new head, assuming linked list ***a*** is not empty. **Your concatenate() function CANNOT use recursion.**

1. (10 points) What are the differences between static and dynamic memory allocations?