hw1: C Programming 1

Started: Sep 17 at 11:46pm

Quiz Instructions

Question 1 — 1 pts

Consider the following code:

```
#include <stdio.h>
#include <stdlib.h>

int main(void) {
    int **x = malloc(sizeof(int *) * 5);

    for (int i = 0; i < 5; i++) {
        x[i] = malloc(sizeof(int) * 5);
    }
    for (int i = 0; i < 5; i++) {
        for (int j = 0; j < 5; j++) {
            x[i][j] = i*j;
        }
    }
    modify(x, 5, 5);
    return 0;
}
```

Which of the implementations of method `modify` below set all elements of the matrix `x` to zero?

```
1. void modify(int **x, int m, int n) {
       for (int i = 0; i < m; i++) {
           for (int j = 0; j < n; j++) {
               x[i][j] = 0;
           }
       }
   }
2. void modify(int x[5][5], int m, int n) {
       for (int i = 0; i < m; i++) {
           for (int j = 0; j < n; j++) {
               x[i][j] = 0;
           }
       }
   }
3. void modify(int *x[], int m, int n) {
       for (int i = 0; i < m; i++) {
```

```
            for (int j = 0; j < n; j++) {
                x[i][j] = 0;
            }
        }
    }
```

- [x] 1, 2 and 3
- [ ] 1 and 3
- [ ] 2 and 3
- [ ] 1 only
- [ ] 1 and 2 only

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Question 2 — 1 pts

Consider the following code:

```
#include <stdio.h>
#include <string.h>

int main(void) {
        char destination[16] = "batman";
        char source[] = "spiderman";
        strcat(destination, source);
        printf("%s %s %d %d", destination, source, strlen(destination), strlen(so
urce));
        return 0;
}
```

The program output is?

- ○ `spiderman spiderman 7 10`
- ○ `spiderman spiderman 9 9`
- ◉ `batmanspiderman spiderman 15 9`
- ○ `spiderman spiderman 10 10`
- ○ `batmanspiderman spiderman 16 10`

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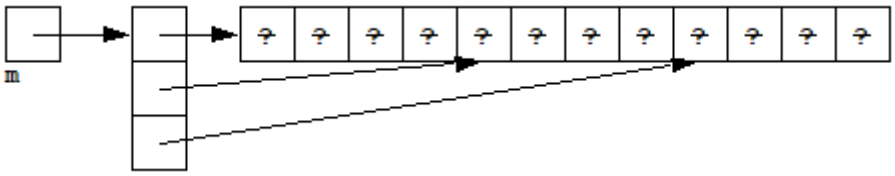
Question 3 1 pts

Consider the following memory diagram where **`m` is on the stack** and the rest is heap memory. It is intended to be used as a 2-dimensional matrix of integers having 3 rows with each having 4 columns (where ? indicates an uninitialized integer value):



Which one of the following code fragments will allocate the heap memory as diagrammed above?

```
int **m = malloc(sizeof(int*) * 3);
m[0] = malloc(sizeof(int*) * 3 * 4);
m[1] = m[0];
m[2] = m[0];
```

```
int **m = malloc(sizeof(int*) * 3);
m[0] = malloc(sizeof(int) * 3 * 4);
m[1] = m[0] + 4;
m[2] = m[1] + 4;
```

```
int *m = malloc(sizeof(int*) * 3);
m[0] = malloc(sizeof(int) * 3 * 4);
```

```
int **m = malloc(sizeof(int*) * 3);
m[0] = malloc(sizeof(int) * 3 * 4);
m[1] = malloc(sizeof(int) * 3 * 4);
m[2] = malloc(sizeof(int) * 3 * 4);
```

```
int *m = malloc(sizeof(int) * 3 * 4);
```

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Question 4 — 1 pts

Consider the following code:

```
#include <stdio.h>

void update(int *x) {
    int *a;
    CODE A
    printf("%d ", *a);
}

int main(void) {
    int a = 4;
    int *b = &a;
    printf("%d ", *b);
    update(b);
    printf("%d ", *b);
    return 0;
}
```

Which one of the following is FALSE?

- ◯ if CODE A is:

```
a = malloc(sizeof(int));

*a = 1;

x = a;
```

then the output is:

```
4 1 4
```

- ◯ if CODE A is:

```
a = malloc(sizeof(int));

a = x;

*x = 1;
```

then the output is:

```
4 1 1
```

○ if CODE A is:

```
a = x;

*a = 16;
```

then the output is:

```
4 16 16
```

◉ if CODE A is:

```
*a = 16;
```

then the output is:

```
4 16 4
```

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Question 5 — 1 pts

```
#include <stdio.h>

int main(void) {
  int i = 11;
  int *ptr1 = &i;
  int **ptr2 = &ptr1;
  int ***ptr3 = &ptr2;

  printf("%p, %p, %p, %p\n", ptr1, ptr2, ptr3, &ptr3);

  return 0;
}
```

If the program output is (where _ is part of the address that is not shown):
`0x_040, 0x_044, 0x_0f0, 0x_0f8`

- At address `0x_044` is stored [11] .
- At address `0x_0f0` is stored [0x_044] .

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Question 6 — 1 pts

Consider the following code:

```
#include <stdio.h>
#include <stdlib.h>

int main(void) {
    int *x = malloc(sizeof(int) * 5);
    for(int i = 0; i < 5; i++) {
        *(x+i) = i;
    }
    CODE A
    return 0;
}
```

Assume that size of an integer is 4 bytes and value of x to be 1000 in decimal. Which of the the following 4 cases for CODE A are correct?

1. If CODE A is:
```
int *y = x+1;
printf("%d %d %d", x, y, y-x);
```
Output will be: `1000 1001 1`

2. If CODE A is:
```
printf("%d ", *x);
x += 2;
printf("%d", x);
```
Output will be: `0 2`

3. If CODE A is:
```
int *y = x + 4;
printf("%d %d %d" , x, y, *(y-3));
```
Output will be: `1000 1016 1`

4. If CODE A is:
```
int *y = x + 2;
```

```
printf("%d %d %d" , x, y, y-x);
```

Output will be: `1000 1008 2`

- ○ 1 and 3
- ○ 2 and 4
- ◉ 3 and 4
- ○ 1 and 4
- ○ 2 and 3

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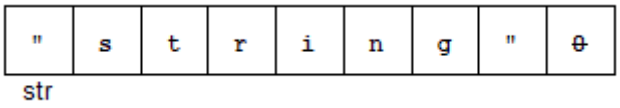
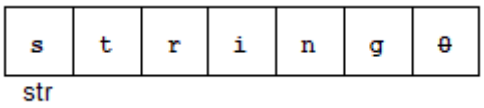
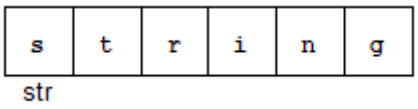
Question 7 — 1 pts

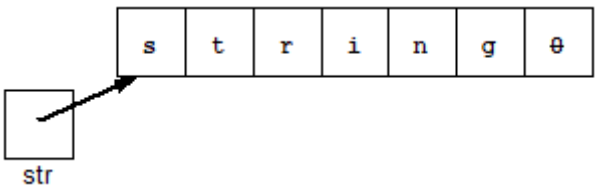
Which one of the following diagrams the memory corresponding to this code:

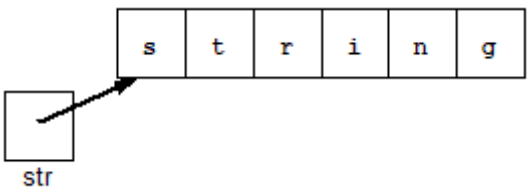
```
char str[] = {'s', 't', 'r', 'i', 'n', 'g'};
```











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Quiz Instructions

Question 8 1 pts

```
#include <stdio.h>

void f(int num1, int num2, int *ptr3) {
        int temp = *(ptr3 + num1);
        ptr3[num1] = ptr3[num2];
        *(ptr3 + num2) = temp;
}

int main(void) {
        int a = 4;
        int b = 1;
        int c[] = {13, 3, 21, 8, 2, 5};

        f(a, b, c);

        printf("%i,%i,%i,%i,%i,%i\n", c[0], c[1], c[2], c[3], c[4], c[5]);

        return 0;
}
```

Which one of the following shows the output of the program?

- ○ 13,3,21,8,2,5
- ○ None of the above
- ○ 8,3,21,13,2,5
- ○ 13,4,21,8,1,5
- ◉ 13,2,21,8,3,5

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