

## 1) (5 pts) DSN (Dynamic Memory Management in C)

There is something terribly wrong with the code given below: it has two memory leaks. After carefully inspecting the code, answer the questions below.

```
1:  int main(void)
2:  {
3:      char *str1 = malloc(sizeof(char) * 16);
4:      char *str2 = malloc(sizeof(char) * 16);
5:
6:      str1[0] = 'p';
7:      str1[1] = 'a';
8:      str1[2] = 's';
9:      str1[3] = 's';
10:     str1[4] = ',';
11:     str1[5] = '\\0';
12:
13:     printf("%s ", str1);
14:     str2 = str1;
15:     printf("%s ", str2);
16:     str2 = NULL;
17:     strcpy(str1, "pass the exam!");
18:     printf("%s\\n", str1);
19:
20:     free(str1);
21:     free(str2);
22:
23:     return 0;
24: }
```

(a) (3 pts) Draw a picture that indicates the relevant state of memory after line 14 has completed. (Draw a rectangular box to indicate dynamically allocated memory.)

(b) (1 pt) Explain why line 14 causes a memory leak.

(c) (1 pt) Why is it possible for the code to crash on line 21?