- CPSC 275: Introduction to Computer Systems

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Fall 2025

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Solution to Homework 24

1.

```
10 10 10 10 ...
```

Because `x` is a local (automatic) variable, its lifetime ends when the function returns. Each recursive call creates a new, independent copy of `x` initialized to 10, so the decrement never persists across calls, and thus the recursion never stops, causing a stack overflow.

2.

```
10 9 8 7 6 5 4 3 2 1
```

Unlike a local variable, a static variable retains its value across recursive calls, so the decrement accumulates and eventually stops the recursion gracefully.

3. A. `arr` is a local variable. It will be automatically deallocated when the function returns.
   B.

```
char *getspace(int n) {
    char *arr = (char *)malloc(n);
    return arr;
}
```

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