16.216: ECE Application Programming
Fall 2015

Lecture 32: Key Questions
November 23, 2015

1. Explain the `malloc()` function.

2. Explain the use of type casting, and why it is necessary with the allocation functions.

3. Explain the `calloc()` function.

4. (Explain the `realloc()` function.

5. **Example:** What does the following program print?

```c
void main() {
   int *arr;
   int n, i;

   n = 7;
   arr = (int *)calloc(n, sizeof(int));
   for (i = 0; i < n; i++)
      printf("%d ", arr[i]);
   printf("\n");

   n = 3;
   arr = (int *)realloc(arr, n * sizeof(int));
   for (i = 0; i < n; i++) {
      arr[i] = i * i;
      printf("%d ", arr[i]);
   }

   n = 6;
   arr = (int *)realloc(arr, n * sizeof(int));
   for (i = 0; i < n; i++) {
      arr[i] = 10 - i;
      printf("%d ", arr[i]);
   }

   free(arr);
}
```

6. What are the common pitfalls of dynamic memory allocation?

7. Explain how to use dynamic memory allocation with strings.

8. Explain how to use dynamic memory allocation with two-dimensional arrays.