

lec5-loop-pointer

April 4, 2018

1 Nested Loops

Zewei Chu, 4/4/2018 - Loops can be nested (for, while)

```
In [3]: #include <stdio.h>
        int main(){
            int height=3, width=5;
            for (int i = 0; i < height; ++i){
                for (int j = 0; j < width; ++j){
                    printf("*");
                }
                printf("\n");
            }
            return 0;
        }
```

Question: How can we draw a triangle?

2-D arrays - create a 2-D array for students' scores of assignments - compute average score for each assignment

```
In [30]: #include <stdio.h>
        #include <stdlib.h>
        #include <string.h>

        #define NUM_STUDENTS 30
        #define NUM_ASSIGNS 13 //10 weeks of assignments, 3 exams

        int main(){
            double scores[NUM_STUDENTS][NUM_ASSIGNS];
            double avg_scores[NUM_ASSIGNS];
            memset(avg_scores, 0, sizeof(double)*NUM_ASSIGNS);
```

```

// except the index to iterate, all other variables
// need to have a meaningful name,
// use either camel case or underscore
for (int i = 0; i < NUM_STUDENTS; i++){
    for (int j = 0; j < NUM_ASSIGNS; j++){
        scores[i][j] = (i * j + 250) % 100;
    }
}

for (int j = 0; j < NUM_ASSIGNS; j++){
    for (int i = 0; i < NUM_STUDENTS; i++){
        // printf("%lf ", scores[i][j]);
        avg_scores[j] += scores[i][j];
    }
    avg_scores[j] /= NUM_STUDENTS;
    printf("average score of assignment %d is: %lf", j, avg_scores[j]);
    printf("\n");
}
}

```

```

average score of assignment 0 is: 50.000000
average score of assignment 1 is: 64.500000
average score of assignment 2 is: 62.333333
average score of assignment 3 is: 50.166667
average score of assignment 4 is: 51.333333
average score of assignment 5 is: 55.833333
average score of assignment 6 is: 50.333333
average score of assignment 7 is: 51.500000
average score of assignment 8 is: 52.666667
average score of assignment 9 is: 50.500000
average score of assignment 10 is: 45.000000
average score of assignment 11 is: 49.500000
average score of assignment 12 is: 54.000000

```

2 Pointers

- a variable pointing to another variable (memory address)
- * and & operators

```

In [26]: #include <stdio.h>
void print(int value){
    printf("%d\n", value);
}
int main(){
    int a = 1, b=2, c=3;
    print(a);
    print(b);
}

```

```

        print(c);
        printf("%p", &a);
    }

```

```

1
2
3
0x7ffeeaab59bc

```

2.1 swap two variable

```

In [27]: #include <stdio.h>
        void swap(int* x, int* y){
            int tmp = *x;
            *x = *y;
            *y = tmp;
        }

        int main(){
            int x = 2, y = 3;
            printf("x: %d, y: %d\n", x, y);
            swap(&x, &y);
            printf("x: %d, y: %d\n", x, y);
        }

```

```

x: 2, y: 3
x: 3, y: 2

```