

# CS 150 Lab 9

## Functions!

### Objectives

For this lab, you are to modify your rocket assignment from lab 6 to use functions. If you do not have a copy of the 06Rocket lab, you can get it out of the “CS150-02 Lab” folder. Copy the 06RocketPUNetID folder to your desktop and rename it **09FunctionsPUNetID**. This new folder is the one you will need to submit after you are done.

### Problem statement

For this project, you will need to write three functions, one to produce each of the parts of the rocket ship: the nose cone, the body, and the fins. The user should still be asked how many rocket ships to build and the same limits on the height apply (height must be between 1-25, inclusive). To display the rocket ship, you will need to call the functions you implement. The main() function should not directly print any part of the rocket ship to the screen.

The output and input of the program should be similar to Lab 6 with two changes:

- Print a full (height = 5) rocket ship to the screen before you ask the user how many rockets to build.
- Ask the user for the character to use to fill the nose code for each rocket the user wants built. In the example below the \* has been used. The rocket ship on the welcome screen should always use the \* to fill the nose cone.

```
  ^
  /*\
 /***\
/*****\
 | C |
 | S |
 | 1 |
 | 5 |
 | 0 |
*****
*****
** ** ** **
** ** ** **
```

## Sample output

```
*****
*                Rocket Ship                *
*****
      ^
      /*\
     /***\
    /*****\
    | C |
    | S |
    | 1 |
    | 5 |
    | 0 |
    *****
    *****
    ** ** ** **
    ** ** ** **
```

How many rocket ships do you want to build? 2

Rocket Ship 1:

How tall do you want this rocket ship? (1-25): 6

What should the nose cone be filled with? o

```
      ^
      /o\
     /ooo\
    /ooooo\
    | C |
    | S |
    | 1 |
    | 5 |
    | 0 |
    |   |
    *****
    *****
    ** ** ** **
    ** ** ** **
```

Rocket Ship 2:

How tall do you want this rocket ship? (1-25): 99

Sorry, that is an invalid height.

Rocket Ship 2:

How tall do you want this rocket ship? (1-25): 4

What should the nose cone be filled with? /

```

      ^
     /\
    // \
   ///  \
  /////  \
 | C |
 | S |
 | 1 |
 | 5 |
*****
*****
** ** ** **
** ** ** **

```

## ***Testing your project***

You should test your project on the following values:

Number of rocket ships: 1  
 Height of rocket ships: 0, 5  
 Fill: \*

Number of rocket ships: 3  
 Height of rocket ships: 6, -1, 4, 99, 20  
 Fill: -

Before submitting your final project, show that your program works by demonstrating it to the instructor or TA.

## ***Submitting your finished project***

Once you have completed your lab projects, you will need to submit it for grading. You will submit your projects to the 'CS150-02 Lab' folder on Turing. You may only submit your projects once, so make sure that they are in their final form. Also, make sure that you submit the correct project. Be sure to close Visual Studio before copying and moving your folder.

**If you do not have time to finish these assignments in Lab, continue working on them outside of class and submit them by 5:15 pm on Friday, November 3, 2006.**

## ***CHALLENGE PROBLEM***

This program is a temperature converter. The user will give a temperature in Fahrenheit, Celsius, or Kelvin and the program will convert it both of the other two temperature scales. The conversions between the temperatures, listed below, should each be implemented in their own function. Use a function to print out the menu below, and any other repeated code you can find. Display each temperature to 2 decimal places.

Conversions:

Fahrenheit to Celsius  $C = (F - 32) * 5/9$

Celsius to Fahrenheit  $F = C * 9/5 + 32$

Kelvin to Celsius  $C = K - 273.15$

Celsius to Kelvin  $K = C + 273.15$

## **Sample Output**

```
*****  
*           Temperature           *  
*****
```

How many temperatures do you want to convert? 2

Temperature 1:

What unit are you starting from?

Fahrenheit (f)

Celsius (c)

Kelvin (k)

> f

Temperature in Fahrenheit: 32

Temperature in Celsius: 0.00

Temperature in Kelvin: -273.15

Temperature 2:

What unit are you starting from?

Fahrenheit (f)

Celsius (c)

Kelvin (k)

> k

Temperature in Kelvin: 0

Temperature in Fahrenheit: -459.67

Temperature in Celsius: -273.15