

**CPE 101**  
**Fall 2009**  
**Laboratory 5 Part I (Loops and arrays)**

**Due Date**

- **Friday October 23rd, 11:59pm (but note that part 2 will be assigned on Wednesday October 21<sup>st</sup>)**
- **You must turn in your source electronically on vogon using the [handin](#) command – instructions are provided in below.**

**Objectives**

- To learn about loops.
- To learn about arrays.
- To practice using loops and arrays.
- To practice problem solving.
- To develop a complete C program, compile it, and turn it in electronically.

**Resources**

- This is a pair programming assignment; partners will be assigned by your instructor.
- You may use your instructor, peers, texts, and your own innate capabilities and resourcefulness!

**Orientation...**

This lab involves some thought and discussion with your lab partner. Make sure you both understand each step.

**Part 1 - Write pseudo-code**

With your current knowledge from the course think about what it would take to write a program to compute the average age of students in this class. The program should take input of the ages of each member of the class (32 students total) and then compute the average age. Write a solution in pseudo code. This means you do not need to use exact C syntax, but you do need to break your solution into incremental steps.

**Part 2 - Examine the following program carefully and describe what it does.**

```
#include <stdio.h>
#include <stdlib.h>

double Fahren2Cel(double F) {
    return ((F-32.0)*(5.0/9.0));
}
```

```

}

void PrintF2C(int end) {
    int i;

    for(i=0; i <= end; i++) {
        printf("%f Fahrenheit is ", (double)i);
        printf("%f Celsius\n", Fahren2Cel((double)i));
    }
}

int main(void) {
    int choice;
    int end;
    double F;

    printf("To convert one value, enter 1. ");
    printf("To print a list of conversions, enter 2: ");
    scanf("%d", &choice);
    if (choice == 1) {
        printf("Enter temperature in Fahrenheit: ");
        scanf("%lf", &F);
        printf("%f Fahrenheit is %f Celsius\n", F, Fahren2Cel(F));
    } else if (choice == 2) {
        printf("Enter the maximum value of conversion list: ");
        scanf("%d", &end);
        PrintF2C(end);
    } else {
        printf("Invalid entry.\n");
    }
    return 0;
}

```

**3) Now examine the following program carefully and describe what it does:**

```

#include <stdio.h>
#include <stdlib.h>

double Fahren2Cel(double F) {
    return ((F-32.0)*(5.0/9.0));
}

int main(void) {
    int choice;
    double F;
    int i, j;

```

```

double CelsiusTemps[20];

printf("To convert one value, enter 1. ");
printf("To print a list of conversions, enter 2: ");
scanf("%d", &choice);
if (choice == 1) {
    printf("Enter temperature in Fahrenheit: ");
    scanf("%lf", &F);
    printf("%f Fahrenheit is %f Celsius\n", F, Fahren2Cel(F));
} else if (choice == 2) {
    j=0;
    for(i=0; i<100; i=i+5) {
        CelsiusTemps[j] = Fahren2Cel((double)i);
        j+=1;
    }
    j=0;
    for (i=0; i < 20; i++) {
        printf("%f Fahrenheit is ", (double)j);
        printf("%f Celsius\n", CelsiusTemps[i]);
        j+=5;
    }
} else {
    printf("Invalid entry.\n");
}
return 0;
}

```

**Part 4: Now write a complete C program to compute the average age of students in this class.**

1. Write your code in a file names lab5p1.c

**Part 5: Test your results and talk to your instructor about what you learned**

**Part 6: Handing in Your Source Electronically...**

2. Transfer your file (lab5p1.c) to vogon as you've done for previous labs
3. Log on to vogon using the Secure Shell Client program (or your favorite equivalent).
4. Change directory (cd-command) to the directory containing the source file or files to hand in.
5. Execute the following command:

```
handin zwood csc101lab05 lab5p1.c
```

6. You should see messages that indicate handin occurred without error. You can (and should) always verify what has been handed in by executing the following command:

```
handin zwood csc101lab05
```