Unix Lab Guide 5

**Note:** Create a new directory by name “lab5”. All the files for this exercise should be saved in this directory only. Names of the files should follow the format ‘loops-chk1.c’, ‘loopschk2.c’ etc. After you complete a checkpoint, make a copy of that file for the next checkpoint and modify the copied file.

Log into orca and use ‘vi’ or ‘pico’ editor to create a file called 'loops-chk1.c'. Write a main() function that would prompt the user for a choice from 1 to 5. Remember to include the libraries that are needed for the program to run properly.

'1' represents the average of a set of numbers,
'2' represents the minimum,
'3' represents the maximum value,
'4' represents temperature conversion for the numbers, and
'5' is used to exit the program.

Use 6 separate printf() statements to prompt the user for the choice (follow the sample output given at the end of the guide). Also, main() must have a 'while' loop to make sure that only numbers 1 to 5 are chosen. Look at the example below:

```c
while(choice >= 1 && choice <= 5) {
    /* Write 6 printf() and 1 scanf() statement here to display the menu and read the number */
}
```

Remember to declare the variable choice at the beginning of the main() functions and initialize it to 1. You can look at the programs in the previous guide to get some idea. Compile and run the program.

**Checkpoint 1**

Now, inside the while() loop, include a 'switch' statement after the scanf() statement to test the user’s choice. Here is the outline of the switch statement –

```c
switch (choice) {
    case 1:
        /*Code to calculate the average*/
        break;
    case 2:
        /* Code to calculate the minimum */
        break;
}
```
Write a case statement for each of the options in the menu. Just put a comment in each case to show its purpose as shown in the example above.

**Checkpoint 2**

For this checkpoint you will be working on the 'average' case. This part will prompt the user for ten temperature values of type 'double', find the average and print the results to the screen using two decimal places to the right. You must make use of a 'for' loop within this case of the switch statement as shown below:

```c
for ( i=0; i<10; i++)
{
    printf("Enter the temperature value: ");
    scanf("%lf", &temp);
    sum = sum + temp;
}
```

Find the average of ten temperature values after this loop and print its value. Make sure you declare all the variables you use. Also initialize variable sum to 0. All the variables should be declared at the beginning of the main().

**Checkpoint 3**

Now you will be working on the 'minimum' case of the 'switch' statement. The case content is given below. It sets the minimum temperature to 200, prompts the user for five temperature values, and prints the minimum temperature. The program compares each temperature value with the value of ‘temp_min’ and if the new temperature is lower than existing value of ‘temp_min’ (used to represent the minimum temperature), then the new temp is set to temp_min. Enter this code into your program. After including the code into the program, compile and run the program.

```c
int index, temp, temp_min = 200; /* Declaration to be given at the beginning of the main() function */
for ( index = 0; index < 5; index++)
{
    printf("Please enter the temperatures: ");
    scanf("%d", &temp);
    if ( temp < temp_min )
        temp_min = temp;
}
printf("The minimum temp is: %d\n", temp_min);
```

Now re-write the above code using a while loop. The while loop should check for the index value and stop when it becomes 5. Increment of index value can be done anywhere within the while loop. Also the value of index should be initialized to zero just before the while loop.
Checkpoint 4
Next enter the code inside the 'maximum' case of the 'switch' statement to find the maximum value among 5 temperature values and print it to the screen. Use a do-while loop with a condition that restricts the number of inputs to 5. Initialize your maximum temperature to 50.

Checkpoint 5
For the final checkpoint, use a 'for' loop to obtain 6 temperature values in degrees Celsius from the user and convert it into degrees Fahrenheit. During each execution of the loop, you should read the value entered by the user in a variable of type double, convert it to temperature in Fahrenheit using the formula given below and print the result.
\[ F = \frac{C}{5} \times 9 + 32 \]
Here F is temperature value in Fahrenheit and C is temperature value in degree Celsius.

Checkpoint 6
Sample Output
Choose one of the following
1. Average
2. Minimum
3. Maximum
4. Temperature Conversion
5. Exit
1
Enter the temperature value: 100
Enter the temperature value: 15
Enter the temperature value: 25
Enter the temperature value: 30
Enter the temperature value: 15
Enter the temperature value: 20
Enter the temperature value: 50
Enter the temperature value: 45
Enter the temperature value: 60
Enter the temperature value: 55
The average temperature is 41.50
Choose one of the following
1. Average
2. Minimum
3. Maximum
4. Temperature Conversion
5. Exit
2
Enter the temperature value: 65
Enter the temperature value: 34
Enter the temperature value: 23
Enter the temperature value: 89
Enter the temperature value: 80
The minimum temperature is 23
Choose one of the following
1. Average
2. Minimum
3. Maximum
4. Temperature Conversion
5. Exit
3
Enter the temperature value: 65
Enter the temperature value: 34
Enter the temperature value: 23
Enter the temperature value: 89
Enter the temperature value: 80
The maximum temperature is 89
Choose one of the following
1. Average
2. Minimum
3. Maximum
4. Temperature Conversion
5. Exit
4
Enter the temperature in degrees Celsius: 10
The temperature in degrees Fahrenheit is 50.
Enter the temperature in degrees Celsius: 15
The temperature in degrees Fahrenheit is 59.
Enter the temperature in degrees Celsius: 20
The temperature in degrees Fahrenheit is 68.
Enter the temperature in degrees Celsius: 25
The temperature in degrees Fahrenheit is 77.
Enter the temperature in degrees Celsius: 30
The temperature in degrees Fahrenheit is 86.
Enter the temperature in degrees Celsius: 35
The temperature in degrees Fahrenheit is 95.
Choose one of the following
1. Average
2. Minimum
3. Maximum
4. Temperature Conversion
5. Exit
5
Exiting the program.