



EGC251 C/C++ Programming

Test 1

First Name:_____ **Last Name:** _____**Key**_____

Problem 1 (15 PT.)

Write a program that calculates calories using the following equation

$$\text{Calories} = [(Age \times 0.2) - (Weight \times 0.09) + (HeartRate \times 0.63) - 55.1] \times Time / 4.2$$

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

```
int main(void) {
    double age, weight, heartrate, time;
    double cal;
    /* Your remaining code goes here */
    printf("Enter your age \n");
    scanf("%lf", &age);
    printf("Enter your weight\n");
    scanf("%lf", &weight);
    printf("Enter your average BPM for the workout\n");
    scanf("%lf", &heartrate);
    printf("Enter the time you exercised for\n");
    scanf("%lf", &time);

    cal = ((Age * 0.2) - (Weight * 0.09) + (heartrate * 0.63) - 55.1) * (time / 4.2);
    printf("Total calories: %lf\n", cal);

    return 0;
}
```

Problem 2 (15 PT.)

Write a program that checks myChoice. If 0, print "Rock". If 1, print "Paper". If 2, print "Scissors". For any other value, print "Unknown". End with newline.

```
#include <stdio.h>
int main(void) {
    int myChoice;
    scanf("%d", &myChoice);
    Switch(myChoice)  {
        Case 0:
            Printf("Rock");
            Break;
        Case 1:
            Printf("Paper");
            Break;
        Case2:
            Printf("Scissors");
        Default:
            Printf("Unknown");
            Break;
    }
    return 0;
}
```

+++++ Alternative solution +++++

```
#include <stdio.h>
int main(void) {
    int myChoice;
    scanf("%d", &myChoice);
    else if (myChoice == 0)
        printf("Rock\n");
    else if (myChoice == 1)
        printf("Paper\n");
    else if (myChoice == 2)
        printf("Scissors\n");
    else
        printf("Unknown\n");
    Return 0;
}
```

Problem 3 (15 PT.)

Print numbers 0, 1, 2, ..., userNum as shown, with each number indented by that number of spaces. For each printed line, print the leading spaces, then the number, and then a newline. Hint: Use i and j as loop variables (initialize i and j explicitly). Note: Avoid any other spaces like spaces after the printed number. Ex: userNum = 3 prints:

```
0
 1
  2
   3
```

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

```
int main(void) {
    int userNum;
    int i;
    int j;
    printf("Enter the final number");
    scanf("%d", &userNum);
    For(i=0; i <= userNum; ++i)    {
        For(j=0; j<i; ++j){
            Printf(" ");
        }
        Printf("%d",i)
    }
    return 0;
}
```

Problem 4 (15 PT.)

Given positive integer numInsects, write a while loop in C that prints that number doubled without reaching numFinal. Follow each number with a space. After the loop, print a newline. Ex: If numInsects = 8, and numFinal is 100, print:

8 16 32 64

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

```
int main(void) {
    int numInsects, numFinal;
    printf("Enter a starting number:");
    scanf("%d", &numInsects); // Must be >= 1
    printf("\n Enter Final Number:"); // Ensure if at least twice the starting number
    scanf("%d", &numFinal);

    /* Put your code here */
    while (numInsects < numFinal)
    {
        printf(" %d ", numInsects);
        numInsects *= 2;
    }
    printf("\n");
    return 0;
}
```

Problem 5 (15 PT.)

Modify the program to accept a list of numbers, calculate and print their sum and average.

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

```
int main(void) {
    const int NUM_ELEMENTS = 8; // Number of elements
    int userVals[NUM_ELEMENTS]; // User numbers
    int i;                       // Loop index
    int sumVal;                   // For computing sum
    int aveVal;                   // For computing average

    // Prompt user to populate array
    printf("Enter %d integer values...\n", NUM_ELEMENTS);

    /* Write your code here */
    for (i=0; i < NUM_ELEMENTS; ++i)
        { scanf("%d",&userVals[i]);
          sumVal=sumVal+userVals[i];
        }
    aveVal=sumVal/NUM_ELEMENTS;
    printf("sum= %d\n", sumVal);
    printf("average= %d\n", aveVal);
    return 0;
}
```

Problem 6 (25 Points)

Solution needs to be submitted using Blackboard via Turnitin prompt.

Write a program that will perform the following:

- I. Display your name and major, followed by a new line.
- II. The main program should prompt the user if they want to continue.
 - a. If “N” is entered, the program exists.
 - b. If “Y” is entered, the main calls the function *key*.
- III. Function *key* should prompt user for a string and should return 1 if the entered string is Go_Hawks. Otherwise it should return a 0.
- IV. The main program should print “Good Key” if function *key* returns a 1. Otherwise, it should print “Bad Key”. At this point, it should go back to II.

```
#include <stdio.h>
int key(void)
{
    char key[20];
    printf("Please enter a string: ");
    scanf("%s",key);
    if (strcmp(key,"Go_Hawks")==0;
        return 1;
    else
        return 0;
}
int main(void)
{
    char con;
    int userKey;
    printf("Name: Student Name\n");
    printf("Major: Student Major\n");
    do
    {
        printf("Do you want to continue? (Type 'Y' for yes or 'N' for no)\n");
        scanf(" %c",&con);
        if (con=='Y')
        {
            userKey=key();
            if (userKey==1)
            {
                printf("Good Key\n\n");
            }
            else
            {
                printf("Bad Key\n\n");
            }
        }
    }
}
```

```

    }
}
else if(con=='N')
{
    printf("\nOk. Program will end.\n");
}
else
{
    printf("\nInvalid Input: Program will end.\n");
}
} while (con=='Y');
return 0;
}

```

+++++ Another Solution +++++

```

#include <stdio.h>
#include <stdlib.h>
//function takes user input string, compares it to the answer and returns 1 when they
match, 0 when they don't match
int key(){
    char hawks[] = "Go_Hawks"; //initialize hawks with correct key
    char userIn[30];
    printf("\nPlease enter the key: "); //user inputs key
    scanf(" %s", userIn);

    if(strcmp(hawks, userIn) == 0){ //compares correct string to user string
        return 1; //returns 1 if they match
    }
    else if(strcmp(hawks, userIn) != 0){ //compares correct string to user string
        return 0; //returns 0 if they don't match
    }
}
}
int main()
{
    printf("Student Name and Major\n");
    char proceed;
    do{ //loops at least once
        int ans = key(); //calls key function
        if(ans == 1){ //when they match, the return was 1 so we print Good Key
            printf("Good Key\n");
        }
    } while (proceed != 'n');
}

```



```
    }
    else if(ans == 0){ //when they don't match, return 0, print Bad Key
        printf("Bad Key\n");
    }
    printf("Would you like to continue? (Y/N) "); //gives user option to abort
    scanf(" %c", &proceed); //store response to char proceed (the test for the do while
loop)
    }while (proceed == 'y' || proceed == 'Y'); //continue loop when user enters y or Y

    return 0;
}
```