Homework #3 – Solution

(C Programming for Beginners - OnLine)

Note: *Complete through Lesson#10 (lecture and demo videos) before attempting this homework,*

3.1 Here is a listing of a program, which asks a user to enter his/her age. It will print:

a) "You are a golden" if the entered age is 50 and

b) "You are not so golden" otherwise.

```
#include <stdio.h>

int main()
{
    int yourAge;

    printf("How old are you?: ");
    scanf("%d", &yourAge);

    if (yourAge == 50)
        printf("You are golden\n");
    else
        printf("You are not so golden\n");
    return 0;
}
```

Modify the above program, so that it will print:

a) "You are a kid" if the age is less than 13

b) "You are a teenager" if the age is between 13 and 19

c) "You are an adult" if greater than 19

Solution:

```
#include <stdio.h>

int main()
{
   int yourAge;

   printf("How old are you?: ");
   scanf("%d", &yourAge);

   //assumes yourAge is between 0 to 100
   if (yourAge < 13)
          printf("You are a kid\n"); //0-12 are kid
   else if (yourAge <= 19)
          printf("You are a teenager\n"); //13-19 are teenager
   else
          printf("You are an adult\n"); //20-100 are adult

   return 0;
}
```

3.2 Here is a calculator program. The program gives a prompt and waits for user to enter a number, operator and another number and gives the output like this:

```
Type a number, operator, number --separated by a space: 12 + 34
12.00 + 34.00 = 46.00
```

Another run looks like this:

```
Type a number, operator, number -- separated by a space: 12   *    12
12.00 * 12.00 = 144.00
```

```c
#include <stdio.h>

int main()
{
	int firstN;
	int secondN;
	char op;

	printf("Type a number, operator, number -- separated by a space: ");

	scanf("%d %c %d", &firstN, &op, &secondN);

	if (op == '+')
		printf("%d + %d = %d",
		firstN, secondN, firstN + secondN);
	else if (op == '-')
		printf("%d - %d = %d",
		firstN, secondN, firstN - secondN);
	else if (op == '*')
		printf("%d * %d = %d",
		firstN, secondN, firstN   * secondN);
	else if (op == '/')
		printf("%d / %d = %d",
		firstN, secondN, firstN / secondN);
	else if (op == '%')
		printf("%d %% %d = %d",
		firstN, secondN, firstN % secondN);
	else
		printf("Unknown operator");
	printf("\n\n");

	return 0;
}
```

Modify the above program, so that it will:

a) Accept decimal numbers as well from the user instead of only integers.

b) Once the output is displayed, ask the user if they want to continue, if they say yes, then repeat the process

Solution:

```c
#include <stdio.h>

int main()
{
	float firstN;
	float secondN;
	char op;
	char answer = 'y';

	while (answer == 'y') {
		printf("Type a number, operator, number--separated by a space:
			");

		scanf("%f %c %f", &firstN, &op, &secondN);

		if (op == '+')
			printf("%5.2f + %5.2f = %5.2f",
			firstN, secondN, firstN + secondN);
		else if (op == '-')
			printf("%5.2f - %5.2f = %5.2f",
			firstN, secondN, firstN - secondN);
		else if (op == '*')
			printf("%5.2f * %5.2f = %5.2f",
			firstN, secondN, firstN   * secondN);
		else if (op == '/')
			printf("%5.2f / %5.2f = %5.2f",
			firstN, secondN, firstN / secondN);
		else if (op == '%')
			printf("%5.2f %% %5.2f = %d",
			firstN, secondN, (int)firstN % (int)secondN);
		else
			printf("Unknown operator");
		printf("\n\n");

		//you first need to flush the buffer, which still has
		//'\n' character due to pressing enter
		while (getchar() != '\n');

		printf("Continue? Type 'y' for yes: ");
		scanf("%c", &answer);
	}
	printf("Thank you for using my calculator\n\n");
	return 0;
}
```

3.3 Ternary/conditional operator ?: works like if .. else.

Here is an example, which finds the maximum of two numbers. It shows how can it be written using if else, and ?: both.

```c
#include <stdio.h>

int main()
{
    int max, a = 10, b = 20; // get value for a and b from user

    //using if else
    if (a > b) {
        max = a;
    }
    else {
        max = b;
    }

    //using ternary operator
    max = (a > b) ? a : b; // what is the value of max?
    printf("The Max is: %d\n\n", max);

    return 0;
}
```

Re-write the above ternary operator code to find the max of three numbers, for example, a, b, and c. Bonus, declare a, b, and c as integer variable and ask the users to enter these three values instead of hard coding them. Also, ask the user to continue if they like to find max of another set of integers.

Hint: You need to daisy chain the conditions!

A sample interaction with the user would look like this:

```
Enter three integer numbers to find max of them--separated by a space:
12 45 90
The Max is: 90

Continue? Type 'y' for yes: y
Enter three integer numbers to find max of them--separated by a space:
34 3 9
The Max is: 34

Continue? Type 'y' for yes: y
Enter three integer numbers to find max of them--separated by a space:
90 1200 90
The Max is: 1200

Continue? Type 'y' for yes: n
Thank you for using my max program

Press any key to continue . . .
```

Solution:

```c
#include <stdio.h>

int main()
{
	int firstN;
	int secondN;
	int thirdN;
	int max;

	char answer = 'y';

	while (answer == 'y') {
		printf("Enter three integer numbers to ");
		printf("find max of them--separated by a space:\n");

		scanf("%d %d %d", &firstN, &secondN, &thirdN);

		//using ternary operator
		max = (firstN > secondN) ? (firstN > thirdN) ?
			  firstN : thirdN: (secondN > thirdN)?
			    secondN: thirdN;

		printf("The Max is: %d\n\n", max);
		//you first need to flush the buffer, which still has
		//'\n' character due to pressing enter
		while (getchar() != '\n');

		printf("Continue? Type 'y' for yes: ");
		scanf("%c", &answer);
	}
	printf("Thank you for using my max program\n\n");

	return 0;
}
```