

Student Name: _____

Course: SWE 110 “ C Programming”

Mid-term exam.

- The exam is 90 minutes (=1.5 hours).
- You are allowed to use any written material (in hard copy or on the computer), including the book, homework solutions, and lecture slides.
- You are **NOT** allowed to search the internet for terms, code snippets, etc. In other words, **no internet please**.
 - The only exception is the course website, where you can find relevant material (past homework, solutions, etc):
http://www.baharav.org/courses/14fa_c.html
- Please write clear programs: Either use comments, or make it clear otherwise.

There are 3 questions, roughly dealing with: Nested loops, Strings/Characters, 2D arrays.

The valuation rubric includes:

1. Solution correctness
2. Follows specifications and constraints
3. Applies previous knowledge (Math/Eng/Science) to current task
4. Efficiency of solution
5. Delivery : On time and in proper form (documentation/comments)

Question 1: (33 points)

```
//
// main.c
// HW13_FA14_MidTerm_Q1_print
//
// In this program you will initially print two adjacent triangles.
// The only argument from the user is the Height.
//
// Part A:
// In the first part of the program, you will print the triangles:
//
// Example 1:
// Height = 3
//
// * *
// *** **
// *****
//
// Example 2:
// Height = 5
//
// * *
// *** **
// *****
// *****
// *****
// *****
//
// Part B: (don't worry about this until you FINISHED part A)
// In the second part (don't worry about it right now!),
// you will decorate these for the holidays,
// and fill them with snow, to look something like:
//
// O O
// ...*+++++*...
// ...**++++**...
// ..*****+*****..
// .*****++*****.
// *****
//
//
// HINT 1: No need for any functions calls. You can put it all in main()
//
// Hint 2: Here is an important hint BEFORE you dive into coding:
// For a given Height input, think (for each row) how many characters, and which,
// need to be printed.
// Do some sketches on paper if it help!!
//
//
#include <stdio.h>

int main(void)
{
    int Height;
```

```

int nr,cc;

printf("Please enter Height of triangle:");
scanf("%d",&Height);

printf("Plain:\n\n");

    // This is where you put your code for printing the triangle.

printf("\n\n\n");

printf("With decoration:\n\n");

    // This is where you put your code for printing the decorated triangles.

printf("\n\n\nExiting\n");

return 0;
}

```

Example screen shot:

```

Debug — bash — 80x26
zachi:~/Desktop/Build/Products/Debug$
zachi:~/Desktop/Build/Products/Debug$ ./HW13_FA14_MidTerm_Q1_print
Please enter Height of triangle:5
Plain:

  *      *
 ***    ***
*****  *****
*****  *****
*****

With decoration:

  o      o
...*****...
...*****...
..*****..
.*****.
*****

Exiting
zachi:~/Desktop/Build/Products/Debug$

```

ANSWER 1

Please attached screenshot + CODE.

Question 2: (33 points)

```
//
// main.c
// HW13_FA14_MidTerm_Q2_Strings
//
// This program deals with strings.
//
// You will write TWO functions that operate on Strings.
//
// Part A:
// First function: strCombine()
// This function takes 4 arguments:
//   input string 1 : s1
//   input string 2 : s2
//   an integer array : b
//   output string : s3
//
// The function picks elements from string 1 and 2 according to the values
// in array b (1 or 2), and puts them in the output string.
// The selection ends when the value in b is 0.
//
// Example:
//   s1 = "ABC" ;
//   s2 = "def" ;
//   b = {1,2,1,0};
// will produce
//   s3 = "AeC"
//
//
// Part B: (don't worry about this until you FINISHED part A)
// The function strExtract does a somewhat reverse thing:
// Taking as input a string (s3) and an integer array b, it returns s1 and s2
// which
// are strings decomposed from s3 according to b.
// For example:
//   s3 = "A89B";
//   b = {1,2,2,1,0};
// will yield:
//   s1 = "AB";
//   s2 = "89"
//
//
// Below are large parts of the code, given to you as a base. You just need to
// fill in some code.
//
// Please do NOT change the main function other than commenting/un-commenting
// the printf calls. This is for testing your function.
// You may comment some parts of main() to enable compilation and smooth
// development process.
```

```

//
// Last but not the least: Do not worry about 'corner cases', e.g. if one of the
// strings is empty. However, it would be nice if you comment in the code about
// WHAT corner cases should we consider.
//
//

#include <stdio.h>

void strCombine(char s1[],char s2[],int b[],char s3[])
{
    // fill in your code
}

void strExtract(char s3[],int b[], char s1[],char s2[])
{
    // fill in your code
}

int main(void)
{
    char str1[80]="Hello World!";
    char str2[80]="Round Kitty.";
    char str3[80];

    int strChooseA[80] = {1,1,1,1,1,2,2,2,2,2,2,1,0};
    int strChooseB[80] = {2,2,2,2,2,1,1,1,1,1,1,2,0};
    int strChooseC[80] = {2,2,1,1,1,2,2,1,0};

    printf("Combining two strings in a meaningful way:\n");
    printf("String 1 = %s\n",str1);
    printf("String 2 = %s\n",str2);

    strCombine(str1,str2,strChooseA, str3);
    // printf("First combination : %s\n", str3);

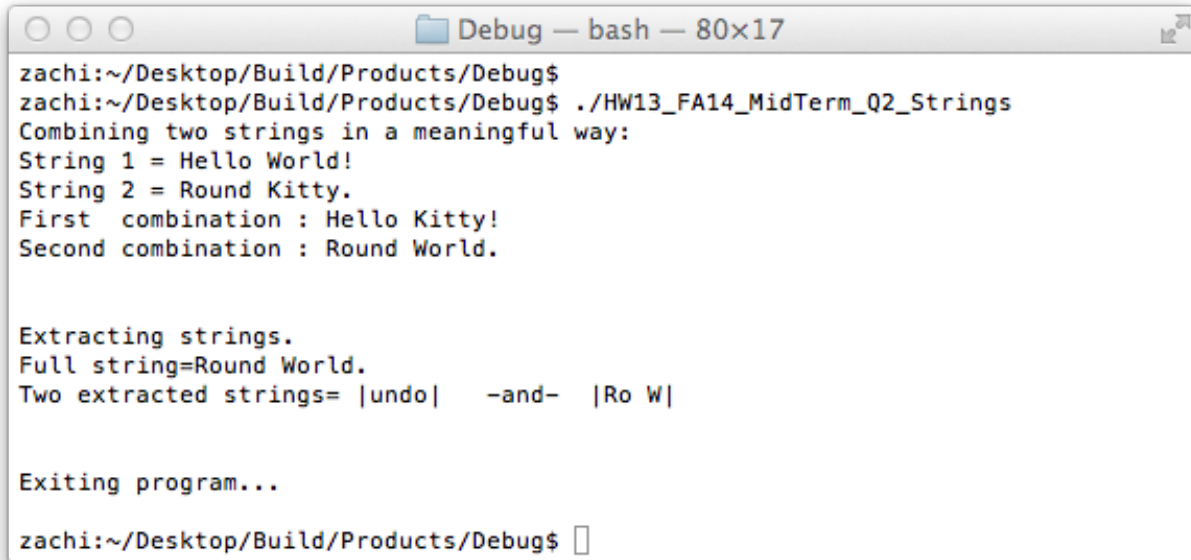
    strCombine(str1,str2,strChooseB,str3);
    // printf("Second combination : %s\n", str3);

    printf("\n\nExtracting strings.\n");
    printf("Full string=%s\n",str3);
    strExtract(str3,strChooseC,str1,str2);
    // printf("Two extracted strings= |%s| -and- |%s|\n",str1,str2);

    printf("\n\nExiting program...\n\n");
}

```

```
    return 0;
}
```



```
zachi:~/Desktop/Build/Products/Debug$
zachi:~/Desktop/Build/Products/Debug$ ./HW13_FA14_MidTerm_Q2_Strings
Combining two strings in a meaningful way:
String 1 = Hello World!
String 2 = Round Kitty.
First combination : Hello Kitty!
Second combination : Round World.

Extracting strings.
Full string=Round World.
Two extracted strings= |undo| -and- |Ro W|

Exiting program...

zachi:~/Desktop/Build/Products/Debug$
```

ANSWER 2

Please attached screenshot + CODE.

Question 3: (34 points)

```
//
// main.c
// HW13_FA14_MidTerm_Q3_2Darray
//
// This programs deals with a 2D characters array.
//
//
// Look at main() and the resulting screen shot.
//
// Then, walk your way through the below assignments:
// (Work on these one by one ! Complete one before moving on).
// 1. Complete the function printMatrix() to print the input matrix.
// 2. Complete the function switchRows, which takes in addition to the array two
integers,
// which are the numbers of the rows to be switched.
// 3. Complete the function switchCols, similar to the above.
// 4. Complete the function switch RowAndCol, which takes the array and ONE number,
and switches
// the approrate row and column.
//

#include <stdio.h>

#define ROW_MAX 5
#define COL_MAX 5

void printMatrix(char Carray[ROW_MAX][COL_MAX])
{
    // fill in your code
}

void switchRows(char Carray[][COL_MAX], int r1, int r2)
{
    // fill in your code
}

void switchCols(char Carray[][COL_MAX], int c1, int c2)
{
    // fill in your code
}

void switchRowAndCol(char Carray[][COL_MAX], int rc)
```



```

{
// fill in your code
}

int main(void)
{
    char C[ROW_MAX][COL_MAX] =
    {
        'A','B','C','D','E',
        49,50 ,51 ,52 ,53 ,
        'a','b','c','d','e',
        48, 50, 52, 54, 56,
        '?','!',':','=' , '+'
    };

    printf("\nOriginal Matrix:\n");
    printMatrix(C);

    printf("\n\nSwitch Rows 1,2:\n");
    switchRows(C,1,2);
    printMatrix(C);

    printf("\n\nSwitch Cols 1,2:\n");
    switchCols(C,1,2);
    printMatrix(C);

    printf("\n\nSwitch Row 2 and Col 2:\n");
    switchRowAndCol(C,2);
    printMatrix(C);

    printf("\nExiting...\n");

    return 0;
}

```

Screen shot:

```
Debug — bash — 80x36
zachi:~/Desktop/Build/Products/Debug$
zachi:~/Desktop/Build/Products/Debug$ ./HW13_FA14_MidTerm_Q3_2Darray

Original Matrix:
A B C D E
1 2 3 4 5
a b c d e
0 2 4 6 8
? ! : = +

Switch Rows 1,2:
A B C D E
a b c d e
1 2 3 4 5
0 2 4 6 8
? ! : = +

Switch Cols 1,2:
A C B D E
a c b d e
1 3 2 4 5
0 4 2 6 8
? : ! = +

Switch Row 2 and Col 2:
A C 1 D E
a c 3 d e
B b 2 2 !
0 4 4 6 8
? : 5 = +

Exiting...
zachi:~/Desktop/Build/Products/Debug$
```

ANSWER 3

Please attached screenshot + CODE.

==== END====

