

Workshop3 - Solutions

1) Nested loops

a.

```
#include <stdio.h>

int main()
{
    int i,j;
    for (i=1; i<=4; i++) //printing first 4 rows
    {
        for(j=4;j>i;j--) // Number of spaces are decreasing in
first 4 rows
        {
            printf(" ");
        }
        for(j=1;j<=2*i-1;j++) //2*i-1 is the number of times * is
printed in each row
        {
            printf("*");
        }
        printf("\n");
    }
    for (i=3; i>=1; i--) //printing last 3 rows
    {
        for(j=3;j>=i;j--)
        {
            printf(" ");
        }
        for(j=1;j<=2*i-1;j++) //2*i-1 is the number of times * is
printed in each row
        {
            printf("*");
        }
        printf("\n");
    }
    return 0;
}
```

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b.

```
#include <stdio.h>
int main()
{
    int i,j, ch='a';
    for (i=1; i<=4; i++) //printing first 4 rows
    {
        for(j=4;j>i;j--) // Number of spaces are decreasing in first
4 rows
        {
            printf(" ");
        }
        for(j=1;j<=2*i-1;j++) //2*i-1 is the number of times * is
printed in each row
        {
            printf("%c",ch);
            ch++;
        }
        printf("\n");
    }
    for (i=3; i>=1; i--) //printing last 3 rows
    {
        for(j=3;j>=i;j--)
        {
            printf(" ");
        }
        for(j=1;j<=2*i-1;j++) //2*i-1 is the number of times * is
printed in each row
        {
            printf("%c",ch);
            ch++;
        }
        printf("\n");
    }
    return 0;
}
```

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2) Getting started with arrays and user defined functions

```
#include <stdio.h>

void evenodd(int); //Initialize function here

void main()
{
    int arr[10]; //It's like 10 int variables in a stack
    int i;
    for (i=0; i<10; i++) //Repeats 10 times (0 - 9)
    {
        printf("Enter number %d:", i+1);
        scanf("%d",&arr[i]);
        evenodd(arr[i]); //Calling function after taking each
input
    }
}

void evenodd(int x) //Defining function- what it is going to
do
{
    if (x%2==0)
        printf("The number is even\n");
    else
        printf("The number is odd\n");
}
```

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3) Grading a multiple choice test

```
#include<stdio.h>

void main()
{
    //Students' answers
    char answers[7][10] = {
        {'A', 'B', 'A', 'C', 'C', 'D', 'E', 'E', 'A', 'D'},
        {'D', 'B', 'A', 'B', 'C', 'A', 'E', 'E', 'A', 'D'},
        {'E', 'D', 'D', 'A', 'D', 'B', 'A', 'E', 'A', 'D'},
        {'A', 'C', 'B', 'A', 'C', 'B', 'E', 'D', 'A', 'D'},
        {'A', 'B', 'A', 'A', 'D', 'B', 'A', 'E', 'B', 'D'},
        {'D', 'C', 'A', 'A', 'D', 'A', 'E', 'E', 'A', 'C'},
        {'E', 'E', 'A', 'A', 'E', 'E', 'A', 'A', 'A', 'D'}};

    // Key to the questions
    char keys[] = {'A', 'B', 'A', 'A', 'C', 'B', 'E', 'E', 'A', 'D'};
    int score[]={0,0,0,0,0,0,0,0};
    int i;
    for (i=0;i<7;i++) //Loop for rows (Students)
    {
        for (int j=0;j<10;j++) //Loop for columns (Answers)
        {
            if (answers[i][j]==keys[j])
                score[i]++;
        }
    }
    for (i=0;i<7;i++)
    {
        printf("The score of student %d is %d\n",i+1,score[i]);
    }
}
```

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4) Guess the date game (Challenge)

```
#include<stdio.h>

void main()
{
    int day = 0; // Day to be determined
    int answer;
    int dates[5][4][4] = {
        {{ 1, 3, 5, 7}, { 9, 11, 13, 15}, {17, 19, 21, 23}, {25,
27, 29, 31}},
        {{ 2, 3, 6, 7}, {10, 11, 14, 15}, {18, 19, 22, 23}, {26,
27, 30, 31}},
        {{ 4, 5, 6, 7}, {12, 13, 14, 15}, {20, 21, 22, 23}, {28,
29, 30, 31}},
        {{ 8, 9, 10, 11}, {12, 13, 14, 15}, {24, 25, 26, 27}, {28,
29, 30, 31}},
        {{16, 17, 18, 19}, {20, 21, 22, 23}, {24, 25, 26, 27},
{28, 29, 30, 31}}
    }; // 5 Sets created, each of 4 rows and 4 columns
    for (int i = 0; i < 5; i++) // Printing each set
    {
        printf("\nIs your birth day in Set %d?\n", (i + 1));
        for (int j = 0; j < 4; j++)
        {
            for (int k = 0; k < 4; k++)
                printf("%d ", dates[i][j][k]);
            printf("\n");
        }
        printf("\n");
        printf("\nEnter 0 for No and 1 for Yes: ");
        scanf("%d",&answer);
        if (answer == 1)
            day += dates[i][0][0]; // Adding only first cell if day is
present in that set
    }
    printf("Your birth day is %d",day);
}
```