Name (Arabic):_____ Class: _____

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**Ain Shams University**
**Faculty of Computer and Information Sciences**
**First Year – Sections 7:11 – Midterm Exam**
**Prof. Zaki Taha**
**Dr. Sally Saad**

**Version 3 (10 am-10:45am)**
**Date: March 21st, 2018**
**Time: 45 minutes**
**Course: CSW150**

## Fundamental of Structured Programming Using C++

Please attempt ALL questions, and **think before you write**.

| **QUESTION (1) True/False. An explanation is required for false answers.** | **(3 points)** | **5-mints** | **Grade** |
|---|---|---|---|
| **(a)** The statement<br>`struct my_struct`<br>`{ int num1, num2;`<br>`char signs[3];`<br>`double result;`<br>`};`<br>`my_struct x;`<br>allocates 20 bytes in memory. **( F )** | | | **0.5** |
| **Answer: 19 bytes (4+4+3+8)** | | | **0.5** |
| **(b)** It is the compiler's task to detect syntax errors for your program. **( T )** | | | **1** |
| **Answer: NO EXPLANATION REQUIRED** | | | |
| **(c)** The output of the following code scrap is **6.** **(F)**<br>`int my2DArr[2][]= {{1,2,3},{4,5,6}};`<br>`cout<<my2DArr[1][2];` | | | **0.5** |
| **Answer:**<br>➔ **Syntax error (we should define at least 2nd dimension size)**<br>**or**<br>➔ `int my2DArr[2][3]= {{1,2,3},{4,5,6}};`<br>**or**<br>➔ `int my2DArr[][3]= {{1,2,3},{4,5,6}};` | | | **0.5** |
| **QUESTION (2) Built-in Functions** | **(3 points)** | **10-mints** | |
| Write in the required code lines | | | |
| In order to solve a 2nd degree equation using mathematical built-in functions, you need to add 3 lines of codes to your program:<br>$X_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$<br>**Note 1:** Assume that a,b,c are declared as int variables and input by the user with correct values.<br>**Note 2:** Use the following functions found in *math.h* file<br>• `float pow (float , int)`<br>• `float sqrt (float)` | **(1) #include <math.h>**<br>**or →#include "math.h"**<br><br>**(2) double x1=(-b+sqrt(pow(b,2)-4*a*c))/2*a**<br><br>**(3)double x2=(-b-sqrt(pow(b,2)-4*a*c))/2*a**<br><br>**(1) #include <math> → 0.5**<br>**#include<cmath> →0.5**<br>**(2) Missing * or any partial mistake in the equation →0.5**<br>**(3) Missing * or any partial mistake in the equation →0.5** | | **1**<br>**1**<br>**1** |
| **QUESTION (3) Code Development** | **(4 points)** | **20-mints** | |

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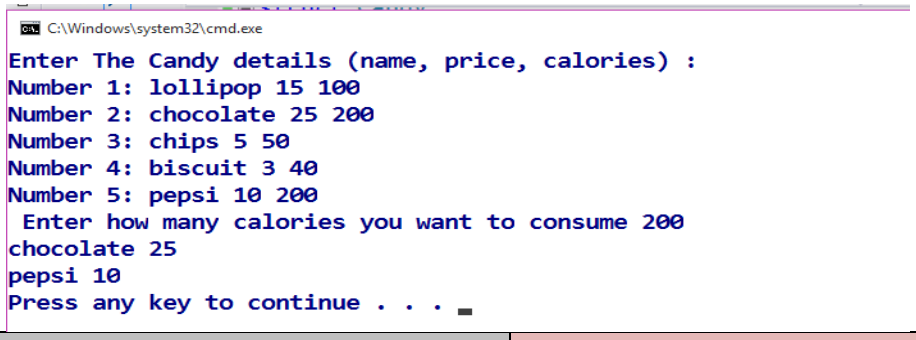
Write a program that takes the details of **5** candies **(name , price , calories ) in an array of structs**. Then asks the user how many calories he wants to consume. Depending on the user's answer, the program should print a list of all candies (name, price) that has calories equal to the user's answer.
***Hint: Assume the candy name consists of only 1 word with 15 characters.***

**Sample Run:**




**Answer:**

Main source file

```
#include <iostream>
using namespace std;
struct Candy
{
        Char name[15];
        float price;
        int calories;
};
void main ()
{
        Candy candyArray [5];
        int numOfCalories , indexOfbestPrice ;
        cout<<"Enter The Candy details (name, price,
calories) :"<<endl;
        for(int i =0;i<5;i++)
        {
                cout<<"Number "<<i+1<<": ";
                cin>>candyArray[i].name >>
candyArray[i].price >> candyArray[i].calories ;
        }
        cout<<" Enter how many calories you want to
consume ";
        cin>>numOfCalories;
        for (int i=0; i<5;i++)
        {
                if(candyArray[i].calories==numOfCalories)
                {
                        cout<<candyArray[i].name<<"
"<<candyArray[i].price<<endl;
                }
        }

}
```

- **User Friendly output msgs (at least one)→ (0.5)**
- **Struct definition→(1)**
- **Array declaration + professional names → (0.5)**
- **Input candy info +calories →(0.5)**
- **Search loop →(1)**
- **Output →(0.5)**

**4**

Best Wishes ☺
Prof. Zaki Taha
Dr. Sally Saad