

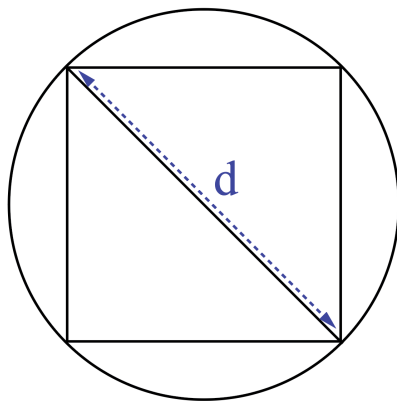
## ITS100 Lab Midterm Quiz 1/2021

**Problem1**

Write a program to take a shape type and a length input (a positive integer shown as  $d$  in the following figure). The program outputs a surface area according to a shape type ('T' for triangle, 'S' for square, or 'C' for circle). The program supports two kinds of input errors.

- The shape error, if the type is not either 'T', 'S' or 'C', then the program outputs a message "Type must be only T/S/C." and the program does not calculate the output.
- The length error, if the length input is not an integer or less than zero, then the program outputs a message "Length must be more than or equal to zero." and does not calculate the output.

The output value must be printed with 2 digits after the decimal point.



$$\text{A triangle surface area} = \frac{1}{2} \times d \times \frac{d}{2} = \frac{d^2}{4}$$

$$\text{A square surface area} = \frac{d^2}{2}$$

$$\text{A circle surface area} = \pi \times \left(\frac{d}{2}\right)^2$$

**Example 1** (user inputs are in *italics*)

Input a shape T/S/C: *C*  
Input a length: *12*  
The surface area of circle is *113.10*

**Example 2** (user inputs are in *italics*)

Input a shape T/S/C: *S*  
Input a length: *12*  
The surface area of square is *72.00*

**Example 3** (user inputs are in *italics*)

Input a shape T/S/C: *T*  
Input a length: *12*  
The surface area of triangle is *36.00*

**Example 4** (user inputs are in *italics*)

Input a shape T/S/C: *T*  
Input a length: *-20*  
Length must be more than or equal to zero.

**Example 5** (user inputs are in *italics*)

Input a shape T/S/C: *t*  
Input a length: *50*  
Type must be only T/S/C.

**Example 6** (user inputs are in *italics*)

Input a shape T/S/C: *s*  
Input a length: *-10*  
Type must be only T/S/C.  
Length must be more than or equal to zero.

This is for educational purposes only. It is not for sale.  
Unauthorized usages and redistributions are not allowed.

## ITS100 Lab Midterm Quiz 1/2021

**Problem 2**

A user enters *first name*, and *age* in a random sequence. Write a python code that identifies information and prints the information in the correct order. The code displays a message when a user enters wrong or incomplete information. Here are the rules to identify each type of information:

- *First name* is composed of only alphabets.
- *Age* is a positive integer between 0 and 120, inclusive.

**Example 1**

Please enter your information: 35,James  
Your name is James.  
Your age is 35.

**Example 2**

Please enter your information: Robert,40  
Your name is Robert.  
Your age is 40.

**Example 3**

Please enter your information: Robert,122  
Please enter your complete information.

**Example 4**

Please enter your information: Bob,James  
Please enter your complete information.

**Example 5**

Please enter your information: 120,20  
Please enter your complete information.

## ITS100 Lab Midterm Quiz 1/2021

**Problem3**

Write a program to get a string as an input and display a pattern output. The program creates the pattern output by taking each input character, interpret the character, and print a pattern for each line according to the character. Here is how to interpret each character:

- Each digit (0123456789) in the input string represents the number of characters to be printed in a line.
- The program must print '#' at the third, the sixth, and the ninth columns, and print '\*' for the other columns.
- All non-numeric characters are ignored. Thus, the program prints nothing and skips to the next character in the input string.

<b>Example 1</b> (user inputs are in <i>italics</i> )	<b>Example 2</b> (user inputs are in <i>italics</i> )	<b>Example 3</b> (user inputs are in <i>italics</i> )
Input: <i>abcdef</i>	Input: <i>1234321</i> * ** **# **#* **# ** *	Input: <i>4a5B6D0.1e1a2</i> **#* **#** **#***  * * **

<b>Example 4</b> (user inputs are in <i>italics</i> )	<b>Example 5</b> (user inputs are in <i>italics</i> )	<b>Example 6</b> (user inputs are in <i>italics</i> )
Input: <i>0103050701</i>  *  **#  **#**  **#***  *	Input: <i>3.141592653589</i> **# * **#* * **#** **#***#* ** **#*** **#* **#* **# **#* **#*** **#***#	Input: <i>708012340o0567</i> **#**#*  **#***  * ** **# **#*  **#** **#*** **#***#

## ITS100 Lab Midterm Quiz 1/2021

**Problem 4**

Write a python code to ask three values from a user: a *special character (either '#', '\$', '@', '\*' or '^')*, a *size of the pattern*, and an *option*. Then, it prints a rectangle of dots with the special character in either the major or minor diagonal shown in the examples. A user can enter a special character to draw a pattern and any positive integer value for the size. Otherwise, display a message “Wrong input values”. The program accepts only 1 or 2 for the option of the pattern. Here, 1 means the major diagonal and 2 means the minor diagonal.

**Example 1**

```
Enter a special character: #
Enter the size of the pattern: 5
Enter option for the pattern: 1
# . . . .
. # . . .
. . # . .
. . . # .
. . . . #
```

**Example 2**

```
Enter a special character: $
Enter the size of the pattern: 4
Enter option for the pattern: 2
. . . $
. . $ .
. $ . .
$ . . .
```

**Example 3**

```
Enter a special character: 6
Enter the size of the pattern: 4
Enter option for the pattern: 1
Wrong input values.
```

**Example 4**

```
Enter a special character: q
Enter the size of the pattern: 5
Enter option for the pattern: 2
Wrong input values.
```

**Example 5**

```
Enter a special character: ^
Enter the size of the pattern: 3
Enter option for the pattern: 6
Wrong input values.
```

## ITS100 Lab Midterm Quiz 1/2021

**Problem 5**

Write a program simulating *an access control system* that outputs either “*Grant*” or “*Deny*” depending on three Boolean features **a**, **b**, **c** of the user’s request as follows.

<i>Input a</i>	<i>Input b</i>	<i>Input c</i>	<i>Output</i>
False	False	False	Grant
False	False	True	Deny
False	True	False	Deny
False	True	True	Deny
True	False	False	Grant
True	False	True	Grant
True	True	False	Grant
True	True	True	Grant

The program outputs “Invalid input” when the user inputs the value other than ‘True’ or ‘False’.

**Example 1** (user inputs are in *italics*)

a, b, c = *False False False*  
Grant

**Example 2** (user inputs are in *italics*)

a, b, c = *False False True*  
Deny

**Example 3** (user inputs are in *italics*)

a, b, c = *False True False*  
Deny

**Example 4** (user inputs are in *italics*)

a, b, c = *True True True*  
Grant

**Example 5** (user inputs are in *italics*)

a, b, c = *True True test*  
Invalid input

## ITS100 Lab Midterm Quiz 1/2021

**Problem 6**

Write a Python program to receive two integer numbers separated by a space. Each number must be between 1 to 30.

- Find the minimum number (assumed that it is  $A$ ) and the maximum number (assumed that it is  $B$ ) between these two inputs.
- Compute the following square root of the summation (where the summation starts from  $A$  and ends at  $B$ ):

$$S = \sqrt{A + (A + 1) + (A + 2) + (A + 3) + \dots + B}.$$

For example, if  $A$  is 5 and  $B$  is 18, we have  $S = \sqrt{5 + 6 + 7 + \dots + 18}$

At the end, the program shows the minimum number  $A$ , the maximum number  $B$ , and the square root of the summation  $S$ . Note that:

- If an input number above is not an integer between 1 and 30, the program shows “Invalid Inputs”.
- The minimum number  $A$  and the maximum number  $B$  are shown as integers.
- The square root of the sum  $S$  is shown as a float number with two digits after the decimal point.

Please see the examples below.

**Example 1** (user inputs are in *italics*)

```
Please enter two integers: 25 6
The minimum number is 6
The maximum number is 25
The square root of the summation is 17.61
```

**Example 2** (user inputs are in *italics*)

```
Please enter two integers: 8 19
The minimum number is 8
The maximum number is 19
The square root of the summation is 12.73
```

**Example 3** (user inputs are in *italics*)

```
Please enter two integers: 12 ABC
Invalid Inputs
```

**Example 4** (user inputs are in *italics*)

```
Please enter two integers: 50 4
Invalid Inputs
```

## ITS100 Lab Midterm Quiz 1/2021

**Problem 7**

Write a Python program to receive **three integers** in the following format:  $A*B*C$ , where  $A$ ,  $B$ , and  $C$  are positive integers (i.e., they are **integers more than zero**). Thereafter, the program will ask a user to choose one of these two options:

- (1) Compute  $A + \sqrt{B^2 + C^3}$ .
- (2) Find the remainder of  $\frac{AB}{C}$ . (Note that  $AB$  is obtained from concatenating  $A$  and  $B$  together. For example, if  $A$  is 5 and  $B$  is 21,  $AB$  is equal to 521. The remainder can be found by using the modulus (%) operator.)

At the end, the program shows the output (as a **float number with two digits after the decimal point**). Note that:

- If  $A$  or  $B$  or  $C$  is not a positive integer, the program shows “**Invalid Inputs**”.
- If the chosen choice is not 1 or 2, the program shows “**Invalid Inputs**”.

Please see the examples below.

**Example 1** (user inputs are in *italics*)

```
Please enter an input: 5*21*8
Please enter your choice (1 or 2): 1
The output is 35.87
```

**Example 2** (user inputs are in *italics*)

```
Please enter an input: 32*4*11
Please enter your choice (1 or 2): 2
The output is 5.00
```

**Example 3** (user inputs are in *italics*)

```
Please enter an input: 32*4*0
Please enter your choice (1 or 2): 1
Invalid Inputs
```

**Example 4** (user inputs are in *italics*)

```
Please enter an input: 32*a*11
Please enter your choice (1 or 2): 2
Invalid Inputs
```



## ITS100 Lab Midterm Quiz 1/2021

**Q8**

Write a program to print out a butterfly pattern using '\*' and '0' as shown in the examples below. The input must be a positive integer and be greater than or equal 3.

If the input is not a positive integer or less than 3, the program displays "Your input is invalid."

**Example 1** (user inputs are in *italics*)

Input: 3

```
*      *
*0    0*
*0**0*
*0    0*
*      *
```

**Example 2** (user inputs are in *italics*)

Input: 5

```
*          *
*0        0*
*0*      *0*
*0*0    0*0*
*0*0**0*0*
*0*0    0*0*
*0*      *0*
*0        0*
*          *
```

**Example 3** (user inputs are in *italics*)

Input: 1

Your input is invalid.

**Example 4** (user inputs are in *italics*)

Input: q

Your input is invalid.