Object-Oriented Programming (3190)

Homework 7

Spring 2023

1. [10pt] Write a program that prompts the user to enter a duration of time in the form of hours, minutes, and seconds. The program should then calculate the duration in seconds and throw three different exception objects: HExcept (if hours are negative), MExcept (if minutes are not between 0 and 59), and SExcept (if seconds are not between 0 and 59).

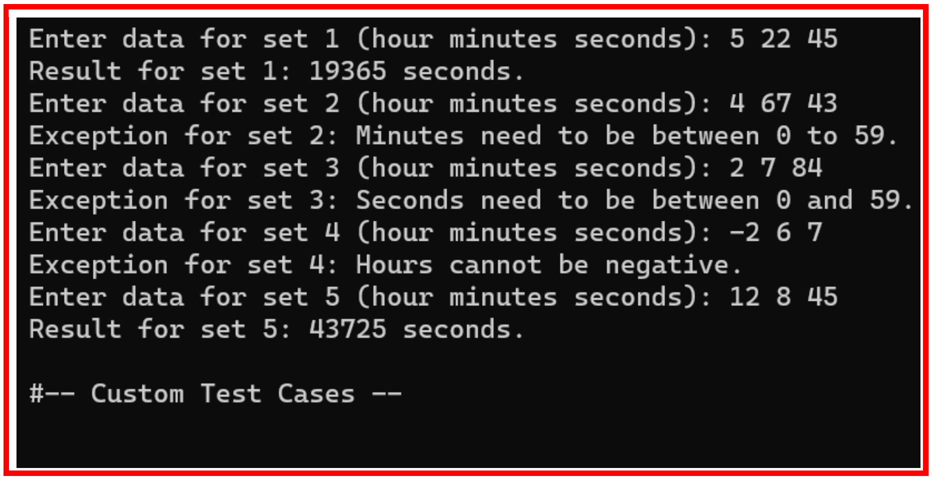
Your solution must meet the following requirements:

(a) Create three exceptional classes that inherit from the following standard exception classes: ***HExcept*** inherited from ***exception***, ***MExcept*** from ***out_of_range***, and ***SExcept*** from ***bad_alloc***.

(b) Utilize polymorphism (catch-by-reference) and a single catch clause to handle all cases.

(d) Make sure that your output matches the following output, and test your code with at least two more test cases on your own. It is preferred to test extreme cases to prove that your code is working correctly.

Possible Output:



```
Enter data for set 1 (hour minutes seconds): 5 22 45
Result for set 1: 19365 seconds.
Enter data for set 2 (hour minutes seconds): 4 67 43
Exception for set 2: Minutes need to be between 0 to 59.
Enter data for set 3 (hour minutes seconds): 2 7 84
Exception for set 3: Seconds need to be between 0 and 59.
Enter data for set 4 (hour minutes seconds): -2 6 7
Exception for set 4: Hours cannot be negative.
Enter data for set 5 (hour minutes seconds): 12 8 45
Result for set 5: 43725 seconds.

#-- Custom Test Cases --
```

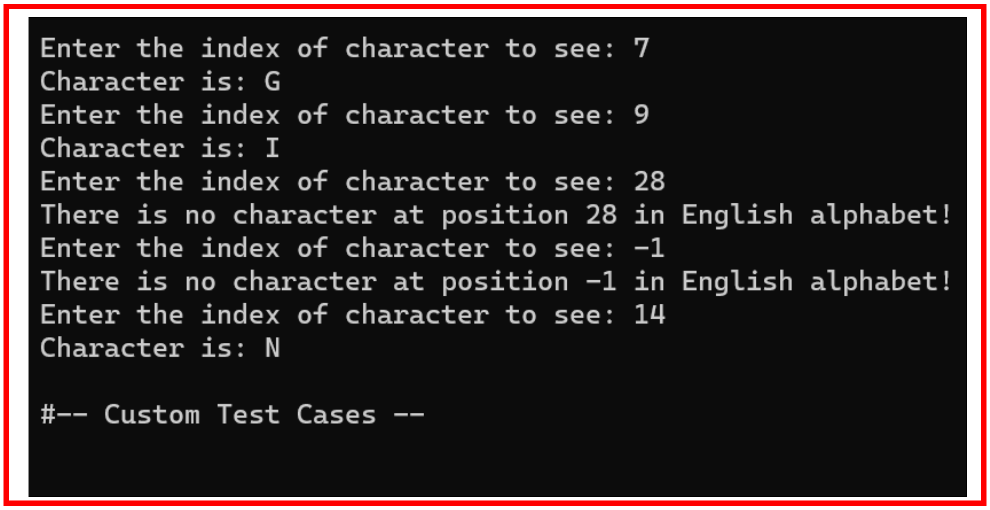
2. [10pt] The <*string*> library throws an exception of type ***out_of_range*** when the ***at***() function tries to access a character not in the range. Write a program that creates a string out of uppercase letters in English and prints the character when the index is given. Use the try-catch block to catch an error if the user enters an index less than 1 or greater than 26.

Your solution must meet the following requirements:

(a) Use ***at()*** function of ***string*** class. Note that we do not need the ***throw*** statement in this case because the library throws an exception; we just need to catch it.

(b) Make sure that your output matches the following output, and test your code with at least two more test cases on your own. It is preferred to test extreme cases to prove that your code is working correctly.

Possible Output:



```
Enter the index of character to see: 7
Character is: G
Enter the index of character to see: 9
Character is: I
Enter the index of character to see: 28
There is no character at position 28 in English alphabet!
Enter the index of character to see: -1
There is no character at position -1 in English alphabet!
Enter the index of character to see: 14
Character is: N

#-- Custom Test Cases --
```

End of Assignment.