```
1   PKG 06: char and String DATA TYPES
2
3   Extended ANSWER to the PKG 05 CHALLENGE:
4                   Rewrite the Letter Grade program using switch statements
5                   Make the program:
6                         - Print: "Good work! Keep it up." if A, B, or C.
7                         - Print: "See your professor. Work harder." if D or F.
8                         - Only use switch statements
9
10  import java.util.Scanner;
11
12  public class Switch {
13
14      public static void main(String[] args) {
15
16          char grade = 0;         // 0 is ASCII code for Null character
17          String message = null;  // initialized vs. not initialized
18
19          Scanner input = new Scanner(System.in);
20
21          while (grade != '!') {
22
23              System.out.print("Please enter your grade(! to quit): ");
24              grade = input.next().toUpperCase().charAt(0); // vs. nextLine()
25              System.out.print("Your grade is " + grade + ". ");
26
27              switch (grade) {    // char, byte, short, int, and ?
28                  case 'A':       // case data type?
29                  case 'B':
30                  case 'C':
31                      message = "Good work! Keep it up.";
32                      break;      // Optional. Fall through to 'F' (until 'break')
33                  case 'D':
34               // case 'D':       // ERROR: Duplicate label
35                  case 'F':
36                      message = "See your professor. Work harder.";
37                      break;
38                  default:
39                      message = "Invalid grade.";
40              }
41
42              System.out.println(message);
43          }
44
45          System.out.println("Thank you!");
46      }
47  }
48
49  Please enter your grade(! to quit): X
50  Your grade is X. Invalid grade.
51  Please enter your grade(! to quit): A
52  Your grade is A. Good work! Keep it up.
53  Please enter your grade(! to quit): b
54  Your grade is B. Good work! Keep it up.
55  Please enter your grade(! to quit): c
56  Your grade is C. Good work! Keep it up.
57  Please enter your grade(! to quit): D
58  Your grade is D. See your professor. Work harder.
59  Please enter your grade(! to quit): f
60  Your grade is F. See your professor. Work harder.
61  Please enter your grade(! to quit): !
62  Your grade is !. Invalid grade.
63  Thank you!
```

char and String DATA TYPES, The BASICS

- *char* is a *primitive* data type which represents a single character.
- *String* is a *reference* data type which represents a string of characters.

---

char Data Type @ https://docs.oracle.com/en/java/javase/12/docs/api/java.base/java/lang/Character.html

```
    public static void main(String[] args) {
        char c1 = 'A';              // character literal
        char c2 = 65;               // ASCII code value in decimal
        char c3 = '\u0041';         // ASCII code value in Unicode value
        char c4 = (char) 0XAB0041; // lower 16 bits hex code 0041
        char c5 = (char) 65.99;     // decimal 65.99

        System.out.println(c1 + " " + c2 + " " + c3 + " " + c4 + " " + c5);
        // OUTPUT: A A A A A
    }
```

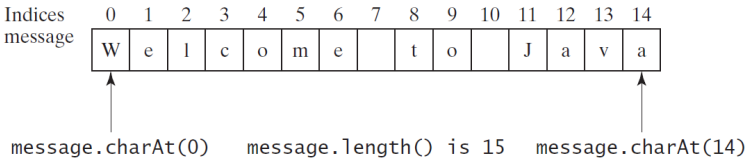
- See ASCII Code Table: https://www.ascii-code.net/

```
    public static void main(String args[]) {

        char c1 = '5';
        if (Character.isDigit(c1)) {
            System.out.println("Yes. A digit.");        // Yes. A digit.
        }
        // Also try isLetter, isLetterOrDigit, isLowerCase, isUpperCase

        char c2 = 'G';
        System.out.println(Character.toLowerCase(c2)); // g
        System.out.println(c2);                        // G
        // Also try toUpperCase
        // for more: https://docs.oracle.com/en/java/javase/12/docs/api/java.base/java/lang/Character.html
    }
```

String Data Type @ https://docs.oracle.com/en/java/javase/12/docs/api/java.base/java/lang/Character.html




```
   public static void main(String[] args) {
        System.out.println(" Hello World from SFSU! "); // Notice whitespaces
        // OUTPUT: Hello World from SFSU!

        String message = " Hello World from SFSU! ";    // Notice whitespaces
        System.out.println(message);
        // OUTPUT: Hello World from SFSU!
        System.out.println(message); // Reusability
        // OUTPUT: Hello World from SFSU!

        System.out.println(message.length());          // 24
        System.out.println(message.trim().length());   // 22
        System.out.println(message.length());          // 24

        System.out.println(message.charAt(7));         // W
        System.out.println(message.concat("--- CSC 210"));
        // OUTPUT:  Hello World from SFSU! --- CSC 210
    }
```

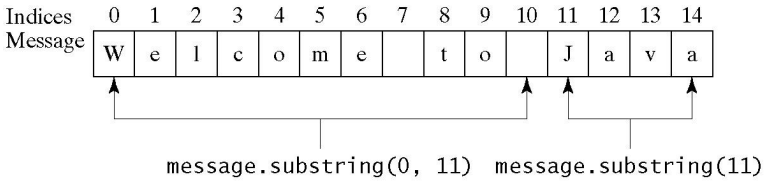
char and String DATA TYPES, the BASICS

Please see and practice

- **The below tables are from our textbook by Daniel Liang**
- **Oracle JAVA Docs: https://docs.oracle.com/en/java/javase/12/docs/api/java.base/java/lang/String.html**

Method	Description
`equals(s1)`	Returns true if this string is equal to string `s1`.
`equalsIgnoreCase(s1)`	Returns true if this string is equal to string `s1`; it is case insensitive.
`compareTo(s1)`	Returns an integer greater than `0`, equal to `0`, or less than `0` to indicate whether this string is greater than, equal to, or less than `s1`.
`compareToIgnoreCase(s1)`	Same as `compareTo` except that the comparison is case insensitive.
`startsWith(prefix)`	Returns true if this string starts with the specified prefix.
`endsWith(suffix)`	Returns true if this string ends with the specified suffix.

Method	Description
`substring(beginIndex)`	Returns this string's substring that begins with the character at the specified `beginIndex` and extends to the end of the string, as shown in Figure 4.2.
`substring(beginIndex, endIndex)`	Returns this string's substring that begins at the specified `beginIndex` and extends to the character at index `endIndex - 1`, as shown in Figure 9.6. Note that the character at `endIndex` is not part of the substring.



Method	Description
`indexOf(ch)`	Returns the index of the first occurrence of `ch` in the string. Returns `-1` if not matched.
`indexOf(ch, fromIndex)`	Returns the index of the first occurrence of `ch` after `fromIndex` in the string. Returns `-1` if not matched.
`indexOf(s)`	Returns the index of the first occurrence of string `s` in this string. Returns `-1` if not matched.
`indexOf(s, fromIndex)`	Returns the index of the first occurrence of string `s` in this string after `fromIndex`. Returns `-1` if not matched.
`lastIndexOf(ch)`	Returns the index of the last occurrence of `ch` in the string. Returns `-1` if not matched.
`lastIndexOf(ch, fromIndex)`	Returns the index of the last occurrence of `ch` before `fromIndex` in this string. Returns `-1` if not matched.
`lastIndexOf(s)`	Returns the index of the last occurrence of string `s`. Returns `-1` if not matched.
`lastIndexOf(s, fromIndex)`	Returns the index of the last occurrence of string `s` before `fromIndex`. Returns `-1` if not matched.

CHALLENGE

Please write a program which asks for a short sentence then continues like demonstrated in the screenshot on the right →

Please spend enough time thinking and writing pseudocode before coding.

```
A short sentence, please: The few the proud

Original String: The few the proud

To upper case: THE FEW THE PROUD
To lower case: the few the proud

3 e/E found!
The last character is: d
```