NAME : .....
STUDENT NO. : .....
GROUP : .....

LESSON 1: STRING HANDLING

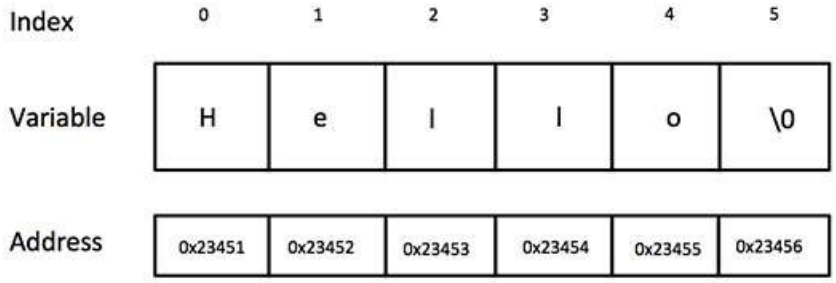

Figure 1: Illustration of string implementation in C++

```
#include <iostream>
using namespace std;

int main ()
{
   char greeting[6] = {'H', 'e', 'l', 'l', 'o', '\0'};

   cout << "Greeting message: ";
   cout << greeting << endl;
}
```

Code 1: Example of string initialization process

Table 1: String manipulation functions in C++

Function	Description
strcpy(s1, s2);	Copies string s2 into string s1.
strcat(s1, s2);	Concatenates string s2 onto the end of string s1.
strlen(s1);	Returns the length of string s1.
strcmp(s1, s2);	Returns 0 if s1 and s2 are the same; less than 0 if s1<s2; greater than 0 if s1>s2.

```
#include <iostream>
#include <string>

using namespace std;

int main ()
{
   char str1[10] = "Hello";
   char str2[10] = "World";
   char str3[10];
   int  len ;

   // copy str1 into str3
   strcpy( str3, str1);
   cout << "strcpy( str3, str1) : " << str3 << endl;

   // concatenates str1 and str2
```

```
    strcat( str1, str2);
    cout << "strcat( str1, str2): " << str1 << endl;

    // total lenghth of str1 after concatenation
    len = strlen(str1);
    cout << "strlen(str1) : " << len << endl;

}
```

Code 2: Example on how to use string manipulation functions in a C++ program

QUESTION 1

Shipping Industries needs a program that allows its shipping staff to enter an item's name, the quantity of the item in inventory and how many units of the item can be packed in a box for shipping. The program should display the item's name, the number of full boxes that can be packed from the quantity on hand and the quantity of items left over.

QUESTION 2

Temp Employer wants a program that will allow the company's clerk to enter an employee's name and the number of hours the employee works every month (the number of hours worked will always be an integer). The program will display the name, number of weeks (assume a 40-hour week), days (assume an 8-hour day) and hours worked. For example, if the employee enters the number 70, the program will display the employee's name, then 1 week, 3 days and 6 hours.

LESSON 2: MATHEMATICAL BUILT-IN FUNCTIONS

Header `<math.h>` declares a set of functions to compute common mathematical operations and transformations

Table 2: Some of the mathematical built-in functions in C++

Function Name	Math Name	Value	Example		
`abs(x)`	absolute value	$\|x\|$	`abs(-1)`	returns	1
`sqrt(x)`	square root	$x^{0.5}$	`sqrt(2.0)`	returns	1.414 …
`exp(x)`	exponential	e^x	`exp(1.0)`	returns	2.718 …
`log(x)`	natural logarithm	ln x	`log(2.718…)`	returns	1.0
`sin(x)`	sine	sin x	`sin(3.14…)`	returns	0.0
`cos(x)`	cosine	cos x	`cos(3.14…)`	returns	-1.0
`tan(x)`	tangent	tan x	`tan(3.14…)`	returns	0.0
`ceil(x)`	ceiling	$\lceil x \rceil$	`ceil(2.5)`	returns	3.0
`floor(x)`	floor	$\lfloor x \rfloor$	`floor(2.5)`	returns	2.0

QUESTION 1

Write function calls to determine:

(a) The square root of 3.45
(b) The square root of x1 – x2
(c) The sine of 90 degrees
(d) The absolute value of x2 + y2

QUESTION 2

The number of bacteria, *BigFoot*, in a certain culture that is subject to refrigerate and be approximated by the equation $BigFoot = 30350\ e^{-0.0234t}$, where t is the time in hours, that the culture has been refrigerated. Using this equation, write a program that prompts the user for a value of time, calculates the number of bacteria in the culture and displays the results.