

### Functions

1. Names of parameters in a function prototype have to match the names given in the function definition. TRUE/FALSE
2. Briefly explain about function prototypes.
3. Write a function named `int zeroCheck(int a, int b, int c);` that is given three integers, and returns 1 if any of the integers is 0, otherwise it returns 0.
4. Write a function: `char getContinue();` that displays to the user "Do you want to continue (y/n): ", and continues to prompt the user until either uppercase or lowercase 'y' or 'n' is entered, returning (lowercase) 'y' or 'n' as the function return value.
5. Write a function `check(x, y, n)` that returns 1 if both x and y fall between 0 and n-1 (both inclusive). The function should return 0 otherwise. Assume that x, y and n are all of type int.
6. Write a function `day_of_year(month, day, year)` that returns the day of the year (an integer between 1 and 366) specified by three arguments.
7. Write a function `num_digits(n)` that returns the number of digits in n (a positive integer)
8. Write a function `digit(n, k)` that returns the  $k^{\text{th}}$  digit (from the right) in n ( a positive integer). For example, `digit(829, 1)` returns 9. `digit(829, 2)` return 2 and `digit(829, 3)` returns 8. If k is greater than the number of digits in n, have the function return 0.

9. What is the output for the following code:

```
#include <stdio.h>
int what(int a, int n)
{
    if(n == 0)
        return 1;
    else if(n % 2)
        return a * what(a * a, n / 2);
    else
        return what(a * a, n / 2);
}
```

```
int main()
{
    int a = 3, b = 5;
    printf("%d\n", what(a, b));
}
```

10. Which of the following would be valid prototypes for a function that returns nothing and has one double parameter?
  - a. void f(double x);
  - b. void f(double);
  - c. void f(x);
  - d. f(double x);
11. Write functions that return the following values. (Assume that a and n are parameters, where a is an array of int values and n is the length of the array)
  - a. The largest element in a
  - b. The average of all elements in a
  - c. The number of positive elements in a
12. Write the following function:  
float compute\_GPA(char grades[], int n);  
the grades array will contain letter grades (A, B, C, D, or F, either uppercase or lowercase); n is the length of the array. The function should return the average of the grades ( assume that A = 4, B = 3, C = 3, D = 1, and F= 0)
13. Write a function to solve the Tower of Hanoi problem using recursion.
14. Write a program to find the gcd of 2 numbers using recursion.
15. Write a program to find the number of digits in an interger using recursion.  
int length(int n);  
length(892) will return 3  
length(3452) will return 4.