Started on	Sunday, 11 February 2024, 4:54 PM
State	Finished
Completed on	Sunday, 11 February 2024, 5:06 PM
Time taken	11 mins 55 secs
Marks	7.67/8.00
Grade	**9.58** out of 10.00 (**95.83**%)

Question 1

Partially correct

Mark 0.67 out of 1.00

Given below are 5 functions that try to calculate the factorial of N. Which of these are ***incorrect*** ?

Select one or more:

a. **factorial(N)**

```
if N == 0:
    return 1
else:
    return factorial(n-1) * n
```

b. **factorial(N)**

```
if N == 0 or N == 1:
    return 1
else:
    return factorial(n-1) * n
```

c. **factorial(N)** ✖

```
if N == 1:
    return 1
else:
    return factorial(n-1) * n
```

d. **factorial(N)** ✔

```
return factorial(n-1) * n
```

e. **factorial(N)** ✔

```
return factorial(n-1)
```

Your answer is partially correct.

You have selected too many options.
4 and 5 do not define a base case therefore raises an error (RecursionError: maximum recursion depth exceeded). “A recursive function is defined in terms of base cases and recursive steps.” - https://web.mit.edu/6.005/www/fa16/classes/14-recursion/ . Therefore without a base case a recursive algorithm will raise an error. Furthermore, the logic in 5 is also wrong.

The correct answers are:

factorial(N)

```
return factorial(n-1) * n,
```

factorial(N)

```
return factorial(n-1)
```

Question 2

Correct

Mark 1.00 out of 1.00

In a little game, a computer is going to randomly select an integer from 1 to 2000. You'll keep guessing numbers until you find the computer's number, and the computer will tell you each time if your guess was too high or too low. How many quesses you need atmost in your worst case scenario given you use an optimal strategy?

Answer: 11 ✔

The correct answer is: 11

Question 3

Correct

Mark 1.00 out of 1.00

Consider the following functions,

```
func1(N)
if N == 0:
        return True
else:
        return func2(N-1)

func2(N)
if N == 0:
        return False
else:
        return func1(N-1)
```

What are the above types of recursive functions called ?

Select one:

- a. Multiple Recursion
- b. Nested Recursion
- c. Mutual Recursion ✔
- d. Linear Recursion
- e. Tail Recursion

Your answer is correct.

"Mutual recursion is a form of recursion where two mathematical or computational objects, such as functions or data types, are defined in terms of each other" - GeeksforGeeks.

Here the function func1 calls func2 and vice versa, making both functions dependent on each other.

The correct answer is:
Mutual Recursion

Question 4

Correct

Mark 1.00 out of 1.00

Given the following method declaration, what will `redo(82, 3)` return?

```
public static int redo(int i, int j)
{
   if (i==0)
      return 0;
   else
      return redo(i/j, j)+1;
}
```

```
Here '/' is integer division.
```

a. 4

b. 7

c. 5 ✔

d. 6

The correct answer is: 5

Question 5

Correct

Mark 1.00 out of 1.00

Consider Following Code

```
void my_recursive_function()
{
    my_recursive_function();
}

int main()
{
    my_recursive_function();
    return 0;
}
```

What will happen when the above snippet is executed?

a. The code will show a compile time error

b. The code will be executed successfully and no output will be generated

c. The code will run for some time and stop when the stack overflows ✔

d. The code will be executed successfully and random output will be generated

The correct answer is: The code will run for some time and stop when the stack overflows

Question 6

Correct

Mark 1.00 out of 1.00

Algorithm(s) which use divide and conquer approach

- [x] a. Binary search ✔
- [x] b. Merge sort ✔
- [ ] c. Insertion Sort
- [ ] d. Selection Sort

The correct answers are: Binary search, Merge sort

Question 7

Correct

Mark 1.00 out of 1.00

There are N number of people attending to a meeting. At the end of the meeting there is a coffee break where everyone can get to know each other. If each person shakes hands with every other attendants how can we calculate total number of handshakes in a recursive manner?

Select the correct recursive function.

- (•) a. f(n)=f(n-1) + (n-1) ✔
- ( ) b. f(n)=f(n-2) + (n-2)
- ( ) c. f(n)=f(n-1)*(n-1)
- ( ) d. f(n)=n*(n-1)/2

The correct answer is: f(n)=f(n-1) + (n-1)

Question 8

Correct

Mark 1.00 out of 1.00

Consider a situation where you don't have function to calculate power (pow() function in C) and you need to calculate x^n where x can be any number and n is a positive integer. What can be the best possible time complexity of your power function?

a. O(n)

b. O(LogLogn)

c. O(nLogn)

d. O(Logn) ✔

Power of a number can be calculated recursively.

Refer https://www.geeksforgeeks.org/write-a-c-program-to-calculate-powxn/

The correct answer is: O(Logn)