Started on	Saturday, 10 February 2024, 4:05 PM
State	Finished
Completed on	Saturday, 10 February 2024, 4:25 PM
Time taken	20 mins 42 secs
Marks	8.00/8.00
Grade	**10.00** out of 10.00 (**100**%)

Question 1

Correct

Mark 1.00 out of 1.00

Recursion is a method in which the solution of a problem depends on

- ○ a.   Smaller instances of different problems
- ○ b.   Larger instances of different problems
- ◉ c.   Smaller instances of the same problem ✔
- ○ d.   Larger instances of the same problem

The correct answer is: Smaller instances of the same problem

Question 2

Correct

Mark 1.00 out of 1.00

Worst case time complexity of Merge Sort

- ○ a. $O(n^2)$
- ○ b. $O(n)$
- ◉ c. $O(n \log(n))$ ✔
- ○ d. $O(\log(n))$

The correct answer is: $O(n \log(n))$

Question 3

Correct

Mark 1.00 out of 1.00

Following are program functions which use recursion to find a given string is a palindrome or not.

```
bool isPalindrome(char str[])
{
    int n = strlen(str);

    if (n == 0)
        return true;

    return palindromRec(str, 0, n - 1);

}


bool palindromRec(char str[], int s, int e)
{
    if (s == e)
        return true;

    if (str[s] != str[e])
        return false;

    if ([__Fill this__])
        return palindromRec(str, s + 1, e - 1);

    return true;
}
```

What is the suitable condition for the blank if statement?

○ a.   s < e + 1 ✔

○ b.   s < e

○ c.   s ≤ e

○ d.   s ≤ e + 1

The correct answers are: s < e + 1, s < e

Question 4

Correct

Mark 1.00 out of 1.00

Which of the following recursion functions can be used to calculate factorial of a number.

○ a.   fact(n) = n * fact(n)

○ b.   fact(n) = n * fact(n+1)

○ c.   fact(n) = n * fact(n-1) ✔

○ d.   fact(n) = n * fact(1)

The correct answer is: fact(n) = n * fact(n-1)

Question 5

Correct

Mark 1.00 out of 1.00

Algorithm(s) which use divide and conquer approach

- ☐ a.   Insertion Sort
- ☐ b.   Selection Sort
- ☑ c.   Merge sort ✔
- ☑ d.   Binary search ✔

The correct answers are: Binary search, Merge sort

Question 6

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.   Linear Recursion
- ○ b.   Multiple Recursion
- ○ c.   Tail Recursion
- ○ d.   Nested Recursion
- ◉ e.   Mutual 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 7

Correct

Mark 1.00 out of 1.00

In a little game, a computer is going to randomly select an integer from 1 to 1000. 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: 10 ✔

The correct answer is: 10

Question 8

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. 7
- b. 5 ✔
- c. 6
- d. 4

The correct answer is: 5