Computer Science and Engineering 2021.03

Sample Midterm Test

Answer all questions in the space provided

Make sure that you have 5 pages

Student Last Name: _____

Student Given Name: _____

Student Id. No: _____

Question	Value	Score
1	30	
2	20	
3	50	

Question 1. [30 points, 10 such questions]

1. [3 points] Whose responsibility is to save the temporary registers when a procedure is called?

2. [3 points] Which procedures do not need to save the return address?

3. [3 points] When can a recursive procedure be turned to an iterative?

4. [3 points] What makes the naive implementation of a 32 bit adder so slow.

5. [3 points]

6. [3 points]

7. [3 points]

8. [3 points]

9. [3 points]

10. [3 points]

Question 2.
[20 points]

1. [7 points] Simplify the following function symbolically:

$$AB + A'C + BC$$

2. [7 points] Draw the gate level wiring diagram of a full adder

Question 3.
[50 points]

1. [20 points] Translate the following procedure to MIPS assembly

```
int FUN1(int x, int y)
{
  return (x+y) + FUN2(y,x);
}
```

You can assume that there is a procedure `FUN2`. Your program has to respect the associativity and order of execution (i.e. you have to compute `x+y` before calling `FUN2`. You have to follow the conventions of procedure calling.

2. [15 points] Write a module that implements a half adder using the `always` construct of Verilog.