Dr. Sheel Sindhu Manohar

CSD 211: Computer Organization and Architecture

TAs: Aaradhy Sharma & Raj Rajeshwar Singh Bisen

Worksheet 2

Instructions- 1) Use only MARS simulator for MIPS32 programming in the lab.

2) Programs given for Brainstorming can be submitted later, but other programs you need to code in the lab only.

3) Save your programs in a separate folder with .asm extension and delete it from the system after making final submission and before leaving the lab.

4) Show the working programs to the TAs available before submitting your word file at blackboard.

5) Any doubts should be clarified with the Tas available in labs

Questions:

1. Write a MIPS assembly program that takes an integer input and determines if it's positive, negative, or zero. Use appropriate branch instructions to print the result.
2. Implement a simple calculator in MIPS assembly that performs addition, subtraction, multiplication, or division based on user input. Use jump instructions to navigate between different operations.

3. Port the following C code to MIPS assembly:

```
int sum = 0;
for (int i = 1; i <= 10; i++) {
if (i % 2 == 0) {
     sum += i;
}
}
printf("Sum of even numbers from 1 to 10: %d\n", sum);
```

4. Convert the following C code to MIPS assembly:

```
int factorial(int n) {
if (n == 0 || n == 1) {
     return 1;
}
```

```
return n * factorial(n - 1);
}
int main() {
int result = factorial(5);
printf("Factorial of 5 is: %d\n", result);
return 0;
}
```

5. Implement the following C code in MIPS assembly:

```
void printFibonacci(int n) {
int first = 0, second = 1, next;
printf("Fibonacci Series up to %d terms:\n", n);

for (int i = 0; i < n; i++) {
     if (i <= 1) {
          next = i;
     } else {
          next = first + second;
          first = second;
          second = next;
     }
     printf("%d ", next);
}
}
int main() {
printFibonacci(10);
return 0;
}
```

NOTE: Write comments to describe each instruction of the above given program. In case any data is missing in the question, kindly take necessary assumptions and write in your README file.