MIPS ASSIGNMENT 4
Semester 5
Group No. 17
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Question 1:

- We use recursion to find the sum of the series.
- Our recursive function is called **sum**.
- We pass the argument “n” that is to what number should we calculate the sum.
- We use 8 bytes in the stack per recursive call – 4 bytes for storing the return address and 4 for storing the argument (current value for “n”)
- Our base condition is checking for n against 0, then we return 0 if they both are equal.
- If the current n is not 0 we call **else** where we recursively call **sum(n-1)**
- Stack unwinding takes place in **sum_return**.
- After this we calculate n^n in **loop** and store the sum in s7 and add it to v0, which we are using as the result variable.
- The whole process is O(n).

Question 2:

- We use recursion to find the number of steps required to reach to 1 while following the rules for Collatz Conjecture.
- Our recursive function is called **collatz**.
- We pass the argument “n” that is the number to be checked against the conjecture.
- We use 4 bytes in the stack per recursive call – 4 bytes for storing the return address.
- Our base condition is checking for n against 1, then we return 0 if they both are equal.
- If the current n is not 1 we check if n is odd or even and accordingly we process it in **else1** and **even** respectively and then move to **else2** finally.
- Stack unwinding takes place in **collatz_return**.
- Each recursive call adds one to the result (except for when n=1).
- We calculate the number of steps and store it in v0 that is the result variable.
- The whole process is O(length of the sequence).