Indian Institute of Technology (IIT-Kharagpur)

AUTUMN Semester, 2023

COMPUTER SCIENCE AND ENGINEERING

Computer Organization and Architecture Laboratory

MIPS Assignment 1

August 7, 2023

AIM: To get acquainted with MIPS assembly language and the system calls. Partial marks will be awarded for incorporating interactive interface as specified, appropriate use of system calls for printing and taking inputs, suitable commenting and correct implementation of the logic.

INSTRUCTIONS: Make one submission per group in the form of a single zipped folder containing your source code(s). Name your submitted zipped folder as Assgn_1_Grp_GroupNo.zip and (e.g. Assgn_1_Grp_25.zip). Inside each submitted source files, there should be a clear header describing the assignment no., problem no., semester, group no., and names of group members. The file name should be of the format QuestionNo_Grp_GroupNo.s (e.g. Q1_Grp_25.s). Liberally comment your code to improve its comprehensibility.

Question 1

Write a complete MIPS-32 program which:

1. Your program takes as input an integer x.
2. Calculate e^x using Taylor series expansion:
   $$\sum_{n=0}^{\infty} \frac{x^n}{n!} = \frac{x^0}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \frac{x^5}{5!} + \cdots$$
   $$= 1 + x + \frac{x^2}{2} + \frac{x^3}{6} + \frac{x^4}{24} + \frac{x^5}{120} + \cdots$$
3. DO NOT USE ANY SUBROUTINE CALL.
4. Compute the series until the intermediate sum does not change in two successive iterations and print the final result with the proper prompt.