Journal Report 3

9/16/19-9/19/19
Jialin Tso
Computer Systems Research Lab
Period 2, White

Daily Log

Monday September 16

Researched mpmath and SymPy and discovered that SymPy requires mpmath to run. Checked that both libraries were installed on workstation. Wrote combination and permutation functions.

Tuesday September 17

Spent most of class writing and testing SymPy's indefinite integral as text to expression. Hardest part was reconciling math, mpmath, and SymPy's built-in functions such as cosine, exp(x), and e. Experimented with each libraries' functions and found out that for exp(2), SymPy returns "exp(2)" while math returns the decimal value. Discovered that eval() can evaluate programmer-defined functions. Necessary because eval() cannot take in any of SymPy's functions like integrate(). For instance, if function is called "def integral(f, x)", eval() can take in a string like "integral(x**2+x, x)", which uses SymPy's integrate().

Thursday September 19

In order for program not to be confused as to which library's functions to call, made sure to use SymPy's functions (e.g. cos(), e) when calculating integrals and derivatives. Text to expression for derivative implemented, but still working on evaluating derivative at specific value. Text to expression for integrals implemented.

Timeline

Date	Goal	Met
Sept 3	Install Wabbitemu and convert text to expression for basic functions	Emulator works and program can calculate many functions (multiple digit number words separated by dashes)
Sept 9	Install SpeechRecognition and word2number; text to expression for factorial, logarithms, and other remaining useful functions	SpeechRecognition, word2number, and num2words installed. Factorial and logarithms work.
Sept 16	Solve integrals, derivatives, and permutations and combinations;	Indefinite and definite integrals and derivatives (not at specified value) solved. Permutations and combinations formulas written.
Sept 23	Solve matrices, text to expression for permutations and combinations, find 1-var stats for user-inputted list.	
Sept 30	Begin experimenting with SpeechRecognition and implementing speech to text. Find 2-var stats for user-inputted lists and find regression equations from lists	

Reflection

Adding the integral and derivative functions to my program took up the entire week, so I have moved back my timeline by one week. I was successful in having my program output definite and indefinite integral and derivative solutions. However, I'm still working on finding out how SymPy evaluates derivatives. For instance, although the SymPy documentation claimed that the answer to "diff(lambda x: x**2 + x, 1.0)" is 3.0, when I ran it on SymPy Live, many error messages popped up.

Example of input and output of current program:

Input: integrate left parentheses x to the power of two times e to the power of x times cosine of left parentheses x right parentheses comma x right parentheses.

Expression output (correct answer, not format): (x**2)*(e**x)*sin(x)/2 + (x**2)*(e**x)*cos(x)/2 - x*(e**x)*sin(x) + (e**x)*sin(x)/2 - (e**x)*cos(x)/2.