Programming at GAMS Development Corporation

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Introduction

General Algebraic Modelling System (GAMS) is a software that allows users to perform incredibly powerful mathematical optimization calculations to the highest efficiency. This software can be applied to practically any industry and has been used to help governments and companies alike make informed decisions. I spent my summer as an intern working at GAMS Development Corporation in Virginia.

Site Information:

GAMS Development Corporation,
https://www.gams.com/

2751 Prosperity Ave Suite 210, Fairfax, VA 22031

Supervisor: Adam Christensen

Goals: Write code for mathematical software in a professional environment

Figure 1: Logo for General Algebraic Modelling Systems Development Corporation (https://gams.com/)

```
In [1]: a.isValid()
Out[1]: True

In [2]: a.records
Out[2]:
        i_0  j_1  k_2  l_3 element_text
0        i0   j0   k1   l4
1        i0   j0   k1  l13
2        i0   j0   k1  l19
3        i0   j0   k1  l23
4        i0   j0   k2   l1
...     ...  ...  ...  ...          ...
312495  i49  j49  k48  l27
312496  i49  j49  k48  l30
312497  i49  j49  k49   l7
312498  i49  j49  k49  l32
312499  i49  j49  k49  l42

[312500 rows x 5 columns]
```

Figure 2: An example data structure imported from a GAMS model into the GAMS Transfer Python API. The input commands are shown as well as the console outputs.

Activities:

I was tasked with working on GAMS Transfer Python – a Python package that allows users to interact with GAMS models in Python. I was able to apply many of the skills I had learned in my computer science coursework to this project. Specifically, I worked on functions that allow users to define and edit data structures – work which was very similar to projects I had completed for CMSC132.

Issues Confronting Site:

The goal of the GAMS Transfer Project is to allow users to formulate their models in Python and transfer the data to and from GAMS. This required me to make use of Python's extensive data manipulation libraries to make sure the task was being handled efficiently.

Impact:

This internship provided me with my first experience in developing software for a professional environment. I was able to create software that would be used by GAMS users. Even if my role as an intern was relatively small, I feel that working as part of a team was a very rewarding experience

Future Work:

Although I didn't get to see my changes implemented in the GAMS system during my summer, this project opens the door to an endless number of opportunities. Combining GAMS' efficient mathematical modelling with Python's powerful data handling will greatly improve the user experience and allow for more sophisticated mathematical analyses.

Acknowledgments:

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