CSCI 330 Assignment 8 - Fall 2021

Generating Reports with awk (100pts)

Overview

Write an awk script that computes and displays a report based on data in the format specified below.

The awk script file name must be `z123456.awk`, where `z123456` is your zid.

The awk script will be invoked from the command line with an input file that contains data on associates and sales:

```
% awk -f z123456.awk inputfile
```

Format Specification

All lines in the input file that begin with a # are to be considered comments and ignored. The same should be done with any blank lines.

The records in the input file will use the semicolon,":", as their field separator, and the newline character as their record separator. The records will all be contained in the same file, and will be of one of the following three types:

1. **Employees** - each employee working with the company will have a record in the following format

#	Field Name	Field Description
1	`type`	for an employee record, this will always be the single letter, 'E'
2	`empid`	decimal integer uniquely identifying the employee
3	`name`	alphanumeric text containing the name of the employee
4	`title`	alphanumeric text containing the employee's title
5	`salary`	decimal integer for the salary of the employee

1. **Projects** - every project that is being worked on will have a record in the following format:

#	Field Name	Field Description
1	`type`	for a project record, this will always be the single letter, 'P'
2	`projid`	a decimal integer uniquely identifying the project
3	`name`	a string containing the name of the project
4	`manager`	the employee id of the project's manager

1. **WorkingOn** - when an employee is assigned to work on a project, they get a record in the data file in the following format:

#	Field Name	Field Description
1	`type`	for a WorkingOn record, this will always be the single letter, 'W'
2	`workid`	a decimal integer uniquely identifying this record
3	`empid`	the employee id of the employee assigned to work
4	`projid`	the project id of the project worked upon

An example input file can be found on Blackboard.

Your awk script should generate a report that shows the following:

1. For each project, show a table that lists the employees working on the project in order of salary from highest to lowest. Make sure to print a star (*) next to the name of the employee that is the project's manager. Be sure to line fields up and label them so that the table is easy to read. An example can be seen below.
2. Below each project table, print the number of employees assigned to work on the project, and their average salary.
3. After all of the projects have been printed, print out the total number of employees, the total number of projects, the total salary of all employees, and the average salary of all employees.

Error Checking

If any error is encountered, such as incorrect data in the input file, just skip the lines in question.

Additional notes

- In the test file, the types of records come in a fixed order. Do not assume this to be the case with all input files, and make sure your program still works, no matter which order the records are entered in. This will require you to use global variables (I'd recommend arrays) to store the data as it comes in.
- Make sure that your assignment is contained in a single file called `z123456.awk` (but based on *your* zid).
- Make sure that your awk script runs properly on the department Linux servers, `turing/hopper`.
- Make sure that your awk file is a regular Unix text file. If you make it on Windows, you can use `dos2unix` to fix the file. Check the manpage if you need it.

What to turn in?

Submit your assignment as a single file via Blackboard before the deadline.

An example of output for the test data can be found on the next page.

Example Run

Here is an example of acceptable output for a script when running on the data provided in the example file:

```
  |= Spice Mining =============|======================|============|
  |    Name                    | Title                |     Salary |
  |============================|======================|============|
  |    Paul Atreides           | Kwisatz Haderach     |   20000000 |
  |    Leto Atreides           | Duke                 |    1500333 |
  |    Shaddam Corrino IV      | Padishah Emperor     |    1000000 |
  |   *Vladimir Harkonnen      | Baron                |     990000 |
  |============================|======================|============|
     employed on project: 4             average salary: 5872583.25

  |= Bene Gesserit Schemes ====|======================|============|
  |    Name                    | Title                |     Salary |
  |============================|======================|============|
  |    Irulan Corrino          | Princess             |     980000 |
  |   *Lady Jessica            | Reverend Mother      |     500000 |
  |============================|======================|============|
     employed on project: 2              average salary: 740000.00

  |= Muad'Dib's Jihad =========|======================|============|
  |    Name                    | Title                |     Salary |
  |============================|======================|============|
  |   *Paul Atreides           | Kwisatz Haderach     |   20000000 |
  |    Stilgar Ben Fifrawi     | Fremen Naib          |     104500 |
  |    Chani Kynes             | Fremen Warrior       |      95000 |
  |============================|======================|============|
     employed on project: 3             average salary: 6733166.67

  |= Security =================|======================|============|
  |    Name                    | Title                |     Salary |
  |============================|======================|============|
  |   *Gurney Halleck          | Warmaster            |     105000 |
  |    Thufir Hawat            | Master of Assassins  |     102000 |
  |    Duncan Idaho            | Swordmaster          |      99500 |
  |============================|======================|============|
     employed on project: 3              average salary: 102166.67

Employees:    11  Projects:     4
Total Salary:             25476333.00
Employee Average Salary:   2316030.27
```

The text of the data used as input when generating the above can be found on the next page.

Text of Input Data

```
# Lines beginning with # are comments and should be ignored, as should blank lines be

# Employee records have 4 fields after E:   E:empid:name:title:salary
E:110:Paul Atreides:Kwisatz Haderach:20000000
E:120:Duncan Idaho:Swordmaster:99500
E:130:Gurney Halleck:Warmaster:105000
E:140:Vladimir Harkonnen:Baron:990000
E:150:Shaddam Corrino IV:Padishah Emperor:1000000
E:160:Irulan Corrino:Princess:980000
E:170:Chani Kynes:Fremen Warrior:95000
E:184:Stilgar Ben Fifrawi:Fremen Naib:104500
E:192:Lady Jessica:Reverend Mother:500000
E:203:Thufir Hawat:Master of Assassins:102000
E:205:Leto Atreides:Duke:1500333
# Project records have 3 fields after P:    P:projid:name:manager
P:1:Spice Mining:140
P:2:Bene Gesserit Schemes:192
P:3:Muad'Dib's Jihad:110
P:4:Security:130

# WorkingOn records have 2 fields after W:  W:workid:empid:projid
W:12:140:1
W:29:110:1
W:31:205:1
W:34:192:2
W:38:160:2
W:54:110:3
W:65:170:3
W:68:184:3
W:72:120:4
W:77:130:4
W:82:203:4
W:90:150:1
```