May 8 & 9, 2025

Microsoft Excel Proficiency with SAS : Unlocking Data Insights and Dynamic Reporting

Su Chee Tay

Principal Technical Training Consultant

SAS Innovate 2025

Microsoft Excel Proficiency with SAS®: Unlocking Data Insights and Dynamic Reporting

Join us for an immersive experience where your command of data meets reporting excellence! Discover the art of seamlessly reading and writing Microsoft Excel data with SAS, unlocking a realm of possibilities. From Excel data ingestion to crafting dynamic reports in Excel using SAS, this session empowers you to navigate the convergence of SAS and Excel. Learn efficient SAS techniques to harness the power of both tools, ensuring a seamless workflow for comprehensive data analysis and reporting. Elevate your skills and gain the expertise needed to unleash the full potential of SAS in creating impactful Excel reports.

Note: The final images showcase results from Microsoft Excel. The provided virtual lab uses LibreOffice. Please note that there might be slight variations in the displayed images when opening them with LibreOffice.

1. Bring up a web browser, Google Chrome works well. Sign in to SAS Viya. From the applications menu that's accessed in the upper left corner, select **Develop Code and Flows** to open SAS Studio. Alternatively, click on the **SAS Studio** bookmark on the ribbon of the browser.
2. Click  in the left pane to access the Explorer. Navigate to **Files** > **Home** > **Workshop**. The course folder, **SIWEXS,** contains the **data**, **development,** and **production** folders.

Step 1: Development

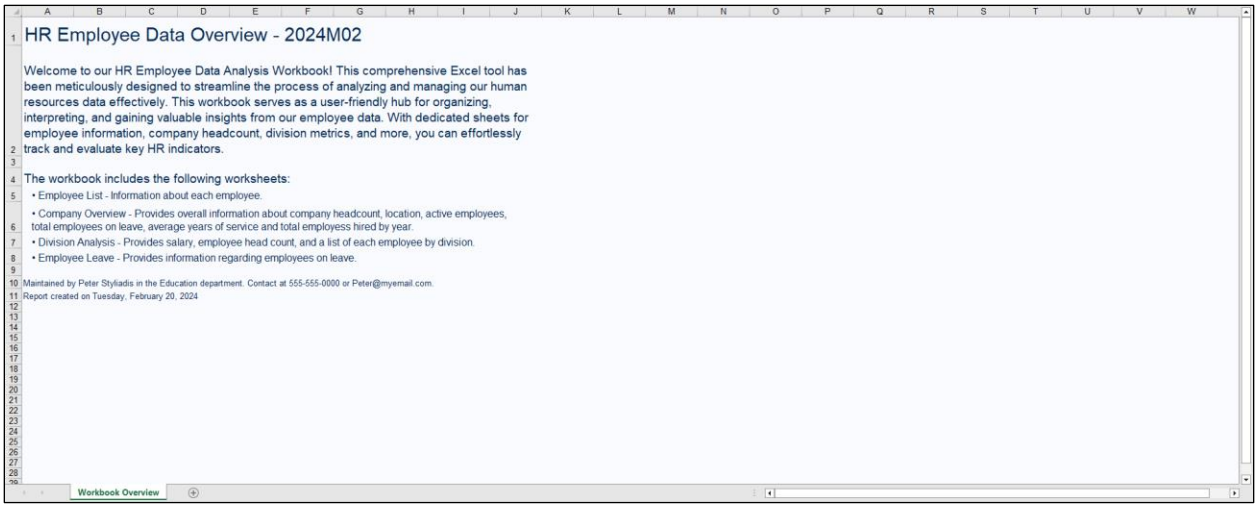
In the **development** folder, we will initiate the process to generate our final Excel workbook. To test our workflow, we'll organize each program to generate a distinct Excel workbook for each worksheet. These workbooks will be saved within the **development** > **output** folder. Then we will combine everything in Step 2.

1. In the course folder, expand the **development** folder.
2. Double-click the **00_config.sas** program to open the file. This program sets up a variety of macro variables for the workshop, such as folder paths, today's date, custom colors, and fonts sizes. Set the value for the **Path** macro variable to point to the folder **Files** > **Home** > **Workshop> SIWEXS.** Run the program and confirm that it ran successfully.
3. Double-click the **01_prepare_data.sas** program to open the file. This program makes a connection to the **2024M04_emp_info_raw.xlsx** workbook in the **data** folder using the XLSX LIBNAME engine. Then it prepares the Excel data and creates the **emp_info_all** and **emp_leave** tables in the **Work** library. Run the program and view the new tables in the results.
4. Double-click the **02_worksheet01.sas** program to open the file. The program reads in the **report_overview_config.xlsx** workbook from the **data** folder and uses the tables to create a new Excel workbook named **worksheet_01.xlsx** in the **development** > **output** folder. The new worksheet will contain overview information about the final workbook.
    a. Run the program and expand the **development** > **output** folder to view the new workbook.
    b. Right-click the **worksheet_01.xlsx** file and select **Download file**.

c. Open the Excel file and view the results.

The Excel workbook will contain a single worksheet named **Workbook Overview** with information about the workbook such as a workbook overview, every worksheet that will be available, who created the report, and the date.

d. Close the workbook.



HR Employee Data Overview - 2024M02

Welcome to our HR Employee Data Analysis Workbook! This comprehensive Excel tool has been meticulously designed to streamline the process of analyzing and managing our human resources data effectively. This workbook serves as a user-friendly hub for organizing, interpreting, and gaining valuable insights from our employee data. With dedicated sheets for employee information, company headcount, division metrics, and more, you can effortlessly track and evaluate key HR indicators.

The workbook includes the following worksheets:

- Employee List - Information about each employee.
- Company Overview - Provides overall information about company headcount, location, active employees, total employees on leave, average years of service and total employess hired by year.
- Division Analysis - Provides salary, employee head count, and a list of each employee by division.
- Employee Leave - Provides information regarding employees on leave.

Maintained by Peter Styliadis in the Education department. Contact at 555-555-0000 or Peter@myemail.com.
Report created on Tuesday, February 20, 2024

Workbook Overview

5. Double-click the **03_worksheet02.sas** program to open the file. The program creates an Excel workbook named **worksheet_02.xlsx** in the **development** > **output** folder. The worksheet will contain a list of employees.

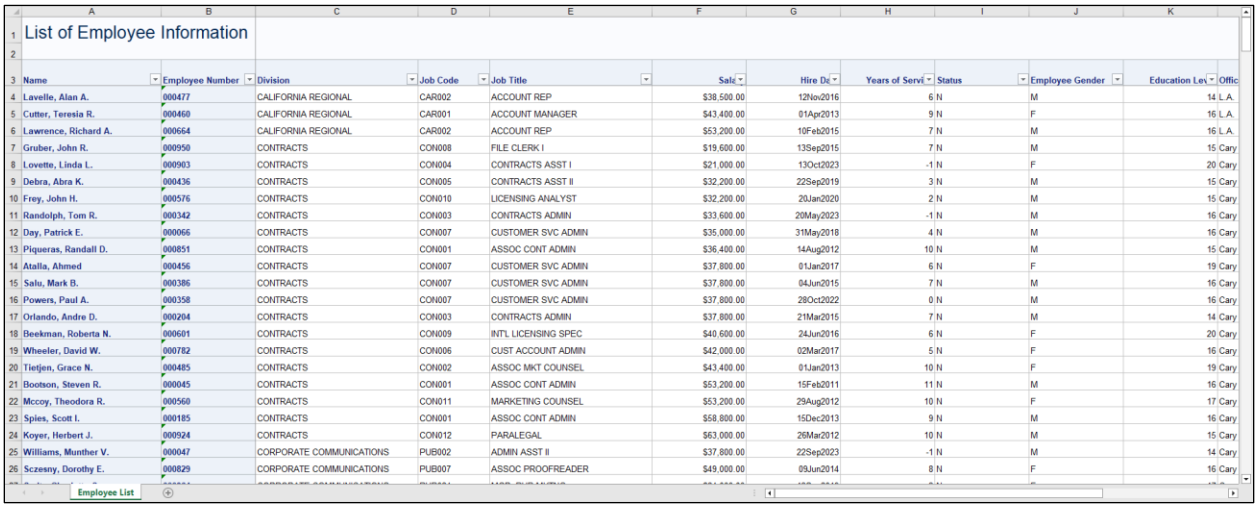
a. Run the program.

b. Right-click the **worksheet_02.xlsx** file and select **Download file**.

c. Open the Excel file and view the results.

The Excel workbook will contain a single worksheet named **Employee List** with a list of all employees and their information. The worksheet will contain specific row and column heights, frozen row and column headings, and an auto filter selection on the Excel table.

d. Close the workbook.



List of Employee Information

Name	Employee Number	Division	Job Code	Job Title	Sala	Hire Da	Years of Servi	Status	Employee Gender	Education Lev	Offic
Lavelle, Alan A.	000477	CALIFORNIA REGIONAL	CAR002	ACCOUNT REP	$38,500.00	12Nov2016	6	N	M	14	L.A.
Cutter, Teresia R.	000460	CALIFORNIA REGIONAL	CAR001	ACCOUNT MANAGER	$43,400.00	01Apr2013	9	N	F	16	L.A.
Lawrence, Richard A.	000664	CALIFORNIA REGIONAL	CAR002	ACCOUNT REP	$53,200.00	10Feb2015	7	N	M	16	L.A.
Gruber, John R.	000950	CONTRACTS	CON008	FILE CLERK I	$19,600.00	13Sep2015	7	N	M	15	Cary
Lovette, Linda L.	000903	CONTRACTS	CON004	CONTRACTS ASST I	$21,000.00	13Oct2023	-1	N	F	20	Cary
Debra, Abra K.	000436	CONTRACTS	CON005	CONTRACTS ASST II	$32,200.00	22Sep2019	3	N	M	15	Cary
Frey, John H.	000576	CONTRACTS	CON010	LICENSING ANALYST	$32,200.00	20Jan2020	2	N	M	15	Cary
Randolph, Tom R.	000342	CONTRACTS	CON003	CONTRACTS ADMIN	$33,600.00	20May2023	-1	N	M	16	Cary
Day, Patrick E.	000066	CONTRACTS	CON007	CUSTOMER SVC ADMIN	$35,000.00	31May2018	4	N	M	16	Cary
Piqueras, Randall D.	000851	CONTRACTS	CON001	ASSOC CONT ADMIN	$36,400.00	14Aug2012	10	N	M	15	Cary
Atalla, Ahmed	000456	CONTRACTS	CON007	CUSTOMER SVC ADMIN	$37,800.00	01Jan2017	6	N	F	19	Cary
Salu, Mark B.	000386	CONTRACTS	CON007	CUSTOMER SVC ADMIN	$37,800.00	04Jun2015	7	N	M	16	Cary
Powers, Paul A.	000358	CONTRACTS	CON007	CUSTOMER SVC ADMIN	$37,800.00	28Oct2022	0	N	M	16	Cary
Orlando, Andre D.	000204	CONTRACTS	CON003	CONTRACTS ADMIN	$37,800.00	21Mar2015	7	N	M	14	Cary
Beekman, Roberta N.	000601	CONTRACTS	CON009	INT'L LICENSING SPEC	$40,600.00	24Jun2016	6	N	F	20	Cary
Wheeler, David W.	000782	CONTRACTS	CON006	CUST ACCOUNT ADMIN	$42,000.00	02Mar2017	5	N	F	16	Cary
Tietjen, Grace N.	000485	CONTRACTS	CON002	ASSOC MKT COUNSEL	$43,400.00	01Jan2013	10	N	F	19	Cary
Bootson, Steven R.	000045	CONTRACTS	CON001	ASSOC CONT ADMIN	$53,200.00	15Feb2011	11	N	M	16	Cary
Mccoy, Theodora R.	000560	CONTRACTS	CON011	MARKETING COUNSEL	$53,200.00	29Aug2012	10	N	F	17	Cary
Spies, Scott I.	000185	CONTRACTS	CON001	ASSOC CONT ADMIN	$58,800.00	15Dec2013	9	N	M	16	Cary
Koyer, Herbert J.	000924	CONTRACTS	CON012	PARALEGAL	$63,000.00	26Mar2012	10	N	M	15	Cary
Williams, Munther V.	000047	CORPORATE COMMUNICATIONS	PUB002	ADMIN ASST II	$37,800.00	22Sep2023	-1	N	M	14	Cary
Sczesny, Dorothy E.	000829	CORPORATE COMMUNICATIONS	PUB007	ASSOC PROOFREADER	$49,000.00	09Jun2014	8	N	F	16	Cary

Employee List

6. Double-click the **04_worksheet03.sas** program to open the file. The program creates an Excel workbook named **worksheet_03.xlsx** in the **development** > **output** folder. The worksheet will contain a series of tables and visualizations providing a company overview analysis.

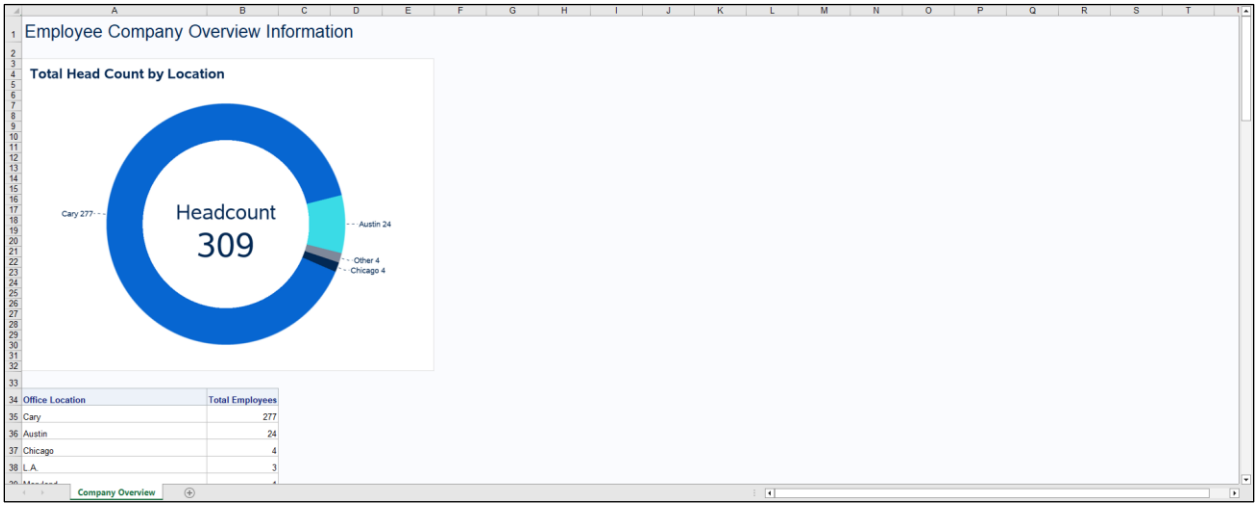
    a. Run the program.

    b. Right-click the **worksheet_03.xlsx** file and select **Download file**.

    c. Open the Excel file and view the results.

    The Excel workbook will contain a single worksheet named **Company Overview** with a series of visualizations and tables.

    d. Close the workbook.



7. Double-click the **05_worksheet04.sas** program to open the file. The program creates an Excel workbook named **worksheet_04.xlsx** in the **development** > **output** folder. The worksheet will contain a visualization and a series of tables displaying division analysis.

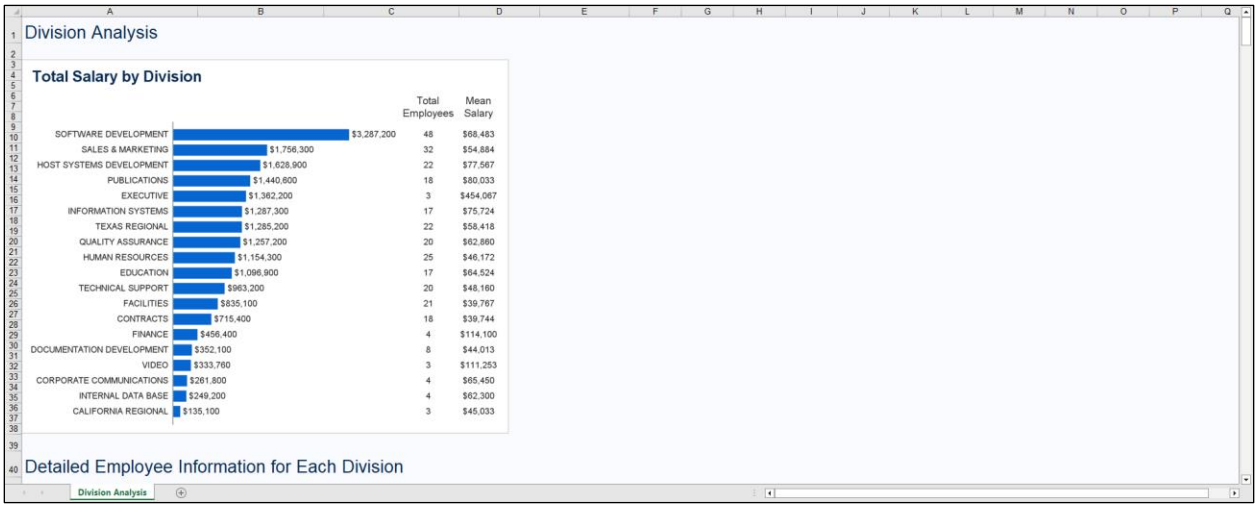
    a. Run the program.

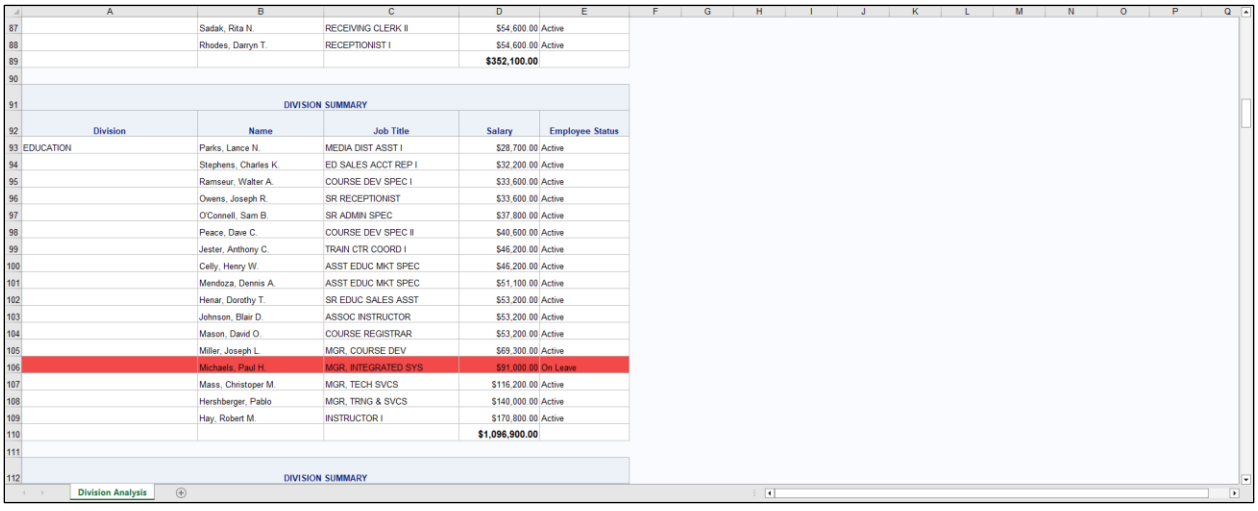
    b. Right-click on the **worksheet_04.xlsx** file and select **Download file**.

    c. Open the Excel file and view the results.

    The Excel workbook will contain a single worksheet named **Division Analysis** with a visualization and series of tables. Notice that the tables contain a red highlighted row if the employee is on leave.

    d. Close the workbook.





8. Double-click the **06_worksheet05.sas** program to open the file. The program creates an Excel workbook named **worksheet_05.xlsx** in the **development** > **output** folder. The worksheet will contain a list table and a series of visualizations analyzing and displaying employees on leave.

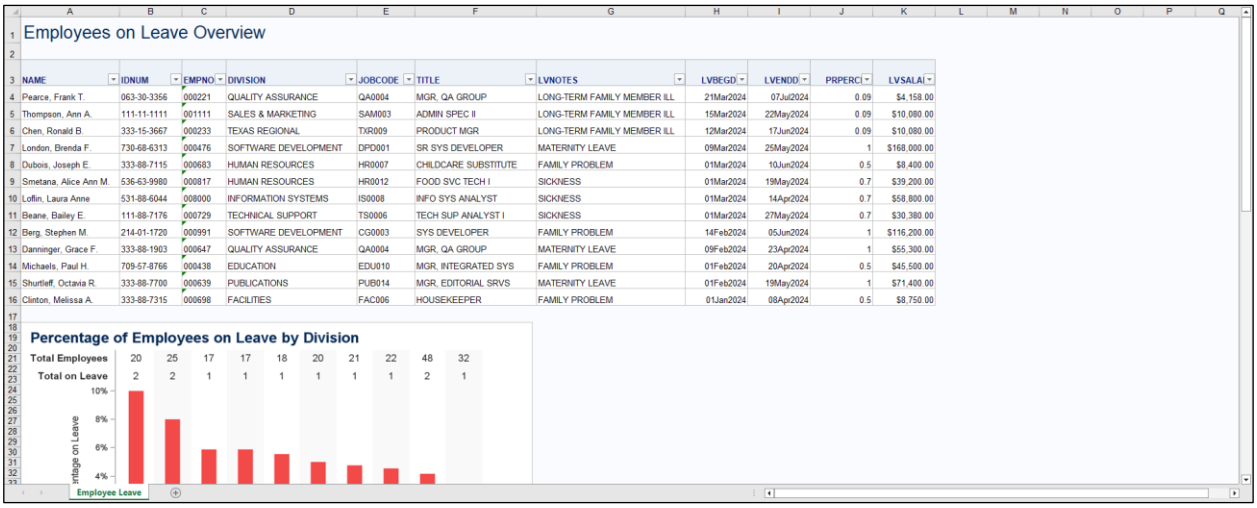
    a. Run the program.

    b. Right-click the **worksheet_05.xlsx** file and select **Download file**.

    c. Open the Excel file and view the results.

    The Excel workbook will contain a single worksheet named **Employee Leave** with a list table and series of visualizations. Notice that the list table contains an auto filter and that the visualizations are displayed.

    d. Close the workbook.



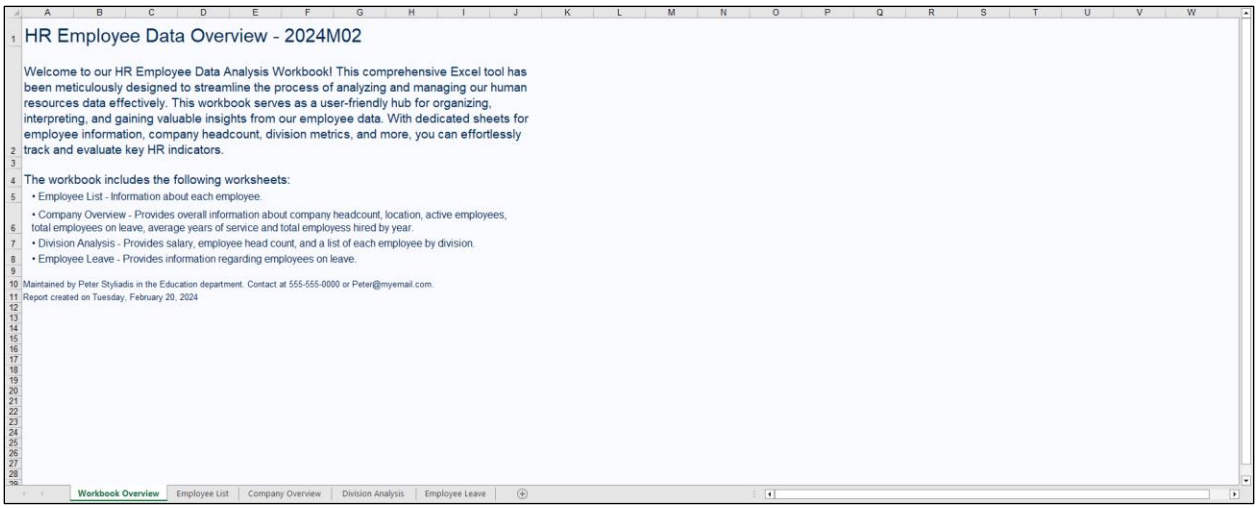
NAME	IDNUM	EMPNO	DIVISION	JOBCODE	TITLE	LVNOTES	LVBEGD	LVENDD	PRPERCI	LVSALA
Pearce, Frank T.	063-30-3356	000221	QUALITY ASSURANCE	QA0004	MGR, QA GROUP	LONG-TERM FAMILY MEMBER ILL	21Mar2024	07Jul2024	0.09	$4,158.00
Thompson, Ann A.	111-11-1111	001111	SALES & MARKETING	SAM003	ADMIN SPEC II	LONG-TERM FAMILY MEMBER ILL	15Mar2024	22May2024	0.09	$10,080.00
Chen, Ronald B.	333-15-3667	000233	TEXAS REGIONAL	TXR009	PRODUCT MGR	LONG-TERM FAMILY MEMBER ILL	12Mar2024	17Jun2024	0.09	$10,080.00
London, Brenda F.	730-68-6313	000476	SOFTWARE DEVELOPMENT	DPD001	SR SYS DEVELOPER	MATERNITY LEAVE	09Mar2024	25May2024	1	$168,000.00
Dubois, Joseph E.	333-88-7115	000683	HUMAN RESOURCES	HR0007	CHILDCARE SUBSTITUTE	FAMILY PROBLEM	01Mar2024	10Jun2024	0.5	$8,400.00
Smetana, Alice Ann M.	536-63-9980	000817	HUMAN RESOURCES	HR0012	FOOD SVC TECH I	SICKNESS	01Mar2024	19May2024	0.7	$39,200.00
Lofin, Laura Anne	531-88-6044	008000	INFORMATION SYSTEMS	IS0008	INFO SYS ANALYST	SICKNESS	01Mar2024	14Apr2024	0.7	$58,800.00
Beane, Bailey E.	111-88-7176	000729	TECHNICAL SUPPORT	TS0006	TECH SUP ANALYST I	SICKNESS	01Mar2024	27May2024	0.7	$30,380.00
Berg, Stephen M.	214-01-1720	000991	SOFTWARE DEVELOPMENT	CG0003	SYS DEVELOPER	FAMILY PROBLEM	14Feb2024	05Jun2024	1	$116,200.00
Danninger, Grace F.	333-88-1903	000647	QUALITY ASSURANCE	QA0004	MGR, QA GROUP	MATERNITY LEAVE	09Feb2024	23Apr2024	1	$55,300.00
Michaels, Paul H.	709-57-8766	000438	EDUCATION	EDU010	MGR, INTEGRATED SYS	FAMILY PROBLEM	01Feb2024	20Apr2024	0.5	$45,500.00
Shurtleff, Octavia R.	333-88-7700	000639	PUBLICATIONS	PUB014	MGR, EDITORIAL SRVS	MATERNITY LEAVE	01Feb2024	19May2024	1	$71,400.00
Clinton, Melissa A.	333-88-7315	000698	FACILITIES	FAC006	HOUSEKEEPER	FAMILY PROBLEM	01Jan2024	08Apr2024	0.5	$8,750.00

Step 2: Production

In the **production** folder, we will consolidate all the programs that we've developed and generate a single Excel workbook for stakeholders. Our objective is to create a single program capable of invoking each individual program and dynamically generating a comprehensive Excel workbook with all the necessary worksheets. The resulting Excel workbook is named based on the date of program execution and saved within the **production** > **output** folder.

1. In the course folder, navigate to the **production** folder. You'll find that it contains an **output** folder, a **programs** folder, and the program named **create_excel_workbook.sas**.
2. The **output** folder serves as the destination for the final Excel workbook.
3. Expand the **programs** folder. Here, you will find all the programs from development. Minor modifications have been made to the programs.
    a. In the **00_config.sas** program, paths have been adjusted to reference the **production** folder.
    b. In the programs **02_worksheet01.sas** through **06_worksheet05.sas**, the ODS statement for creating a new Excel workbook was removed in each program. In addition, the SHEET_INTERVAL= option has been changed from NONE to NOW to create a new worksheet in the final workbook for each program.
4. Double-click the **create_excel_workbook.sas** program to open it. This program is designed to execute all the necessary programs to create the final Excel workbook.
    a. Comments in the first part of the program provide an overview.
    b. Under **REQUIREMENT: SPECIFY MAIN FOLDER PATH**, a macro variable is set to reference the main workshop folder.
    c. Under **CONFIGURATION FILE SETTINGS**, the %INCLUDE statement executes the **00_config.sas** program from the **programs** folder. This program sets all necessary macro variables and macro programs.
    d. Under **PREPARE DATA**, the %INCLUDE statement executes the **01_prepare_data.sas** program from the **programs** folder. This program creates all the necessary tables for the Excel workbook.
    e. Under **CREATE EXCEL WORBOOK**, the code creates the final Excel workbook.
        i. The ODS _ALL_ CLOSE statement closes all default SAS output destinations.
        ii. The ODS GRAPHICS statement sets image output to PNG.
        iii. The ODS EXCEL FILE= statement creates the final Excel file, using the **currMonthYear** macro variable to dynamically name the workbook by appending the current month and year to **_HR_REPORT_FINAL.xlsx**. The SHEET_INTERVAL= option is set to NONE to disable the automatic creation of new worksheets.
        iv. A series of %INCLUDE statements execute the **02_worksheet01.sas** to **06_worksheet05.sas** programs, each creating a separate worksheet in the workbook.
        v. The ODS EXCEL CLOSE statement closes the Excel output.
        vi. The ODS HTML statement turns on the default HTML output.

5. Run the **create_excel_workbook.sas** program and confirm that the program ran successfully.
6. Expand the **production** > **output** folder. Locate the **2024M04_HR_REPORT_FINAL.xlsx** workbook.
7. Right-click the **2024M04_HR_REPORT_FINAL.xlsx** file and select **Download file**. Open the workbook.
8. Notice that the final workbook contains all five worksheets with analysis consolidated into a single workbook.



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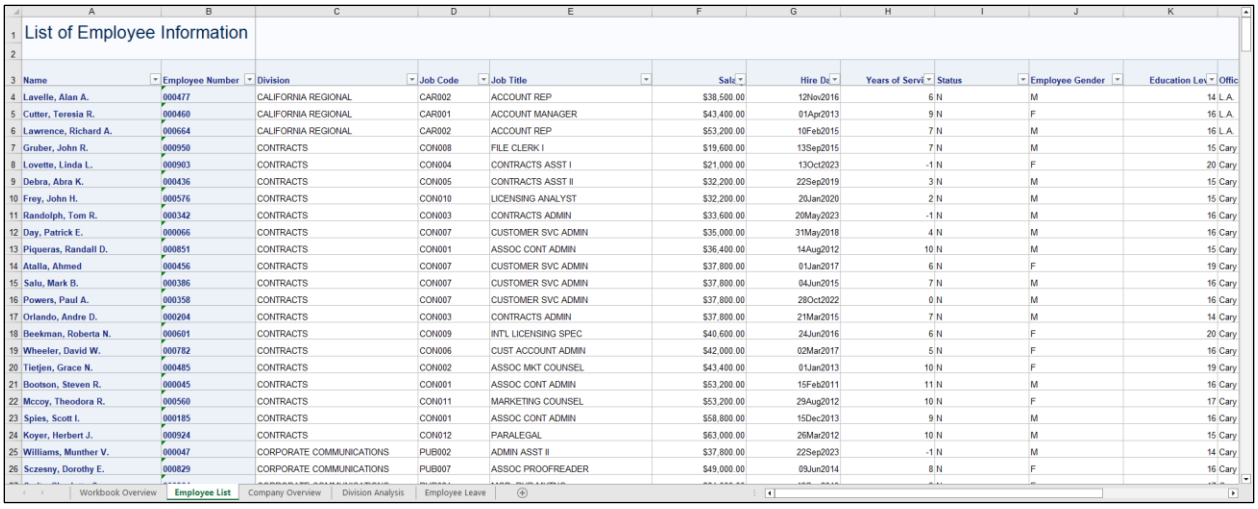
Report created on Tuesday, February 20, 2024

Workbook Overview | Employee List | Company Overview | Division Analysis | Employee Leave



List of Employee Information

Name	Employee Number	Division	Job Code	Job Title	Sala	Hire Da	Years of Servi	Status	Employee Gender	Education Lev	Offic
Lavelle, Alan A.	000477	CALIFORNIA REGIONAL	CAR002	ACCOUNT REP	$38,500.00	12Nov2016	6	N	M	14	L.A.
Cutter, Teresia R.	000460	CALIFORNIA REGIONAL	CAR001	ACCOUNT MANAGER	$43,400.00	01Apr2013	9	N	F	16	L.A.
Lawrence, Richard A.	000664	CALIFORNIA REGIONAL	CAR002	ACCOUNT REP	$53,200.00	10Feb2015	7	N	M	16	L.A.
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Lovette, Linda L.	000903	CONTRACTS	CON004	CONTRACTS ASST I	$21,000.00	13Oct2023	-1	N	F	20	Cary
Debra, Abra K.	000436	CONTRACTS	CON005	CONTRACTS ASST II	$32,200.00	22Sep2019	3	N	M	15	Cary
Frey, John H.	000576	CONTRACTS	CON010	LICENSING ANALYST	$32,200.00	20Jan2020	2	N	M	15	Cary
Randolph, Tom R.	000342	CONTRACTS	CON003	CONTRACTS ADMIN	$33,600.00	20May2023	-1	N	M	16	Cary
Day, Patrick E.	000066	CONTRACTS	CON007	CUSTOMER SVC ADMIN	$35,000.00	31May2018	4	N	M	16	Cary
Piqueras, Randall D.	000851	CONTRACTS	CON001	ASSOC CONT ADMIN	$36,400.00	14Aug2012	10	N	M	15	Cary
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Orlando, Andre D.	000204	CONTRACTS	CON003	CONTRACTS ADMIN	$37,800.00	21Mar2015	7	N	M	14	Cary
Beekman, Roberta N.	000601	CONTRACTS	CON009	INT'L LICENSING SPEC	$40,600.00	24Jun2016	6	N	F	20	Cary
Wheeler, David W.	000782	CONTRACTS	CON006	CUST ACCOUNT ADMIN	$42,000.00	02Mar2017	5	N	F	16	Cary
Tietjen, Grace N.	000485	CONTRACTS	CON002	ASSOC MKT COUNSEL	$43,400.00	01Jan2013	10	N	F	19	Cary
Bootson, Steven R.	000045	CONTRACTS	CON001	ASSOC CONT ADMIN	$53,200.00	15Feb2011	11	N	M	16	Cary
Mccoy, Theodora R.	000560	CONTRACTS	CON011	MARKETING COUNSEL	$53,200.00	29Aug2012	10	N	F	17	Cary
Spies, Scott I.	000185	CONTRACTS	CON001	ASSOC CONT ADMIN	$58,800.00	15Dec2013	9	N	M	16	Cary
Koyer, Herbert J.	000924	CONTRACTS	CON012	PARALEGAL	$63,000.00	26Mar2012	10	N	M	15	Cary
Williams, Munther V.	000047	CORPORATE COMMUNICATIONS	PUB002	ADMIN ASST II	$37,800.00	22Sep2023	-1	N	M	14	Cary
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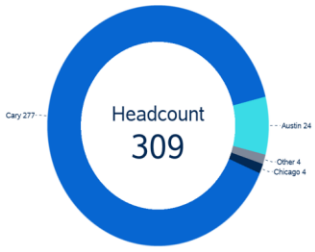
Workbook Overview | Employee List | Company Overview | Division Analysis | Employee Leave

Employee Company Overview Information

Total Head Count by Location

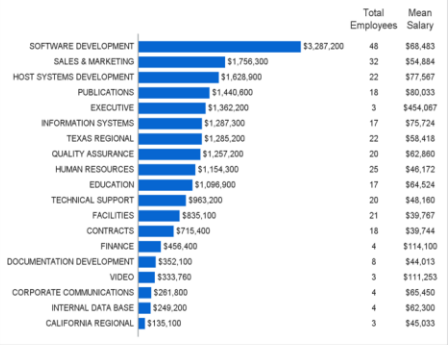


Office Location	Total Employees
Cary	277
Austin	24
Chicago	4
L.A.	3

Workbook Overview | Employee List | **Company Overview** | Division Analysis | Employee Leave

Division Analysis

Total Salary by Division



Detailed Employee Information for Each Division

Workbook Overview | Employee List | Company Overview | **Division Analysis** | Employee Leave

Employees on Leave Overview

NAME	IDNUM	EMPNO	DIVISION	JOBCODE	TITLE	LVNOTES	LVBEGD	LVENDD	PRPERC	LVSALA
Pearce, Frank T.	063-30-3356	000221	QUALITY ASSURANCE	QA0004	MGR, QA GROUP	LONG-TERM FAMILY MEMBER ILL	21Mar2024	07Jul2024	0.09	$4,158.00
Thompson, Ann A.	111-11-1111	001111	SALES & MARKETING	SAM003	ADMIN SPEC II	LONG-TERM FAMILY MEMBER ILL	15Mar2024	22May2024	0.09	$10,080.00
Chen, Ronald B.	333-15-3667	000233	TEXAS REGIONAL	TXR009	PRODUCT MGR	LONG-TERM FAMILY MEMBER ILL	12Mar2024	17Jun2024	0.09	$10,080.00
London, Brenda F.	730-68-6313	000476	SOFTWARE DEVELOPMENT	DPD001	SR SYS DEVELOPER	MATERNITY LEAVE	09Mar2024	25May2024	1	$168,000.00
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Loflin, Laura Anne	531-88-6044	008000	INFORMATION SYSTEMS	IS0008	INFO SYS ANALYST	SICKNESS	01Mar2024	14Apr2024	0.7	$58,800.00
Beane, Bailey E.	111-88-7176	000729	TECHNICAL SUPPORT	TS0006	TECH SUP ANALYST I	SICKNESS	01Mar2024	27May2024	0.7	$30,380.00
Berg, Stephen M.	214-01-1720	000991	SOFTWARE DEVELOPMENT	CG0003	SYS DEVELOPER	FAMILY PROBLEM	14Feb2024	05Jun2024	1	$116,200.00
Danninger, Grace F.	333-88-1903	000647	QUALITY ASSURANCE	QA0004	MGR, QA GROUP	MATERNITY LEAVE	09Feb2024	23Apr2024	1	$55,300.00
Michaels, Paul H.	709-57-8766	000438	EDUCATION	EDU010	MGR, INTEGRATED SYS	FAMILY PROBLEM	01Feb2024	20Apr2024	0.5	$45,500.00
Shurtleff, Octavia R.	333-88-7700	000639	PUBLICATIONS	PUB014	MGR, EDITORIAL SRVS	MATERNITY LEAVE	01Feb2024	19May2024	1	$71,400.00
Clinton, Melissa A.	333-88-7315	000698	FACILITIES	FAC006	HOUSEKEEPER	FAMILY PROBLEM	01Jan2024	08Apr2024	0.5	$8,750.00

Percentage of Employees on Leave by Division

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