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Due Date Dynamo

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**UiPath workflow document**

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# Objective



This project aims to combine assignment deadlines from several platforms (such as eFundi announcements, eFundi calendars, Project Briefs, etc.) into a single deadline tracker by utilizing RPA and UiPath at North West University. Additionally, this approach ought to notify students of deadlines in advance. The RPA solution helps students to prevent missed submissions and reduces their academic stress. The focus of the Solution architecture will be on:

* The Rob.
* Its Scalability;
* Efficiency of the Rob.
* Reusability

The information provided here is mostly intended for the developers who will build the solution initially and afterwards for the support developers in case changes are made.

# Scope

**Data Extraction**

* Scraping assessment’s due dates and important details from sources efundi announcement, efundi Test and quizzes then efundi assignments

**Data consolidation**

* The storage for all scraped data is Microsoft Excel, different files each storing its relevant data (i.e., announcements URLs & messages, different assessment due dates & Efundi sites for a particular student)
* Exception handling provides screenshots at the moment of an error, Output is also saved in this folder

**Reminders**

* Reminders will be sent to a particular student/user at the intervals

(A week, three days & a day) before the deadline/due date

* Reminders are sent through outlook to the email entered by the user

**Visualization**

* The bot at the end opens a web application where the user navigates through to view all deadlines in color coding
* Green table for more 5 days before due date
* Yellow table for 3 to 5 days left
* Red table for 3 days before the due date)

**Exception handling**

* The Bod captures live time screenshot for errors faced when using other platforms, unrecognized data or invalid input from user
* This output can be used for manual review or further analysis

# Technical workflow description

## Workflow Architecture

The Deadline Tracking and Reminder System workflow is created using UiPath as an RPA (Robotic Process Automation) solution. It is made up of the following elements:

* **UiPath Studio**: Used to create and configure the RPA workflow
* **UiPath orchestrator**: Used to manage, deploy and monitor this RPA Bot
* **Microsoft excels**: Used as a storage mechanism
* **Microsoft Outlook**: Used to send reminders to students.
* **Mozilla Firefox**: Used to display all deadlines to students in a colored code

## Process Flowchart

**Data Extraction**

**Data consolidation**

**Reminders**

**Visualization**

**Exception handling**

## Data Flow

|  |  |
| --- | --- |
| ITEM NAME | DESCRIPTION |
| Data sources | *These consist of eFundi Announcement, test and quizzes and assignment, where due dates are specified.* |
| UiPath Workflow | *Data from the sources are retrieved, processed, and consolidated by the RPA workflow.* |
| Data Storage | *The due dates for all scraped assessments are kept in Excel as data storage system.* |
| Email System | *Based on the data that has been stored, the RPA automatically reminds Students* |
| UI Web | *Students can obtain and view deadline information on the Web* |
|

## Exception handling

Exception handling is a crucial component of the workflow.

* **Error detection**, The RPA workflow checks for mistakes like unclear email formats or inaccessible course pages.
* **Screenshot capture**, the routine takes a screenshot to document the circumstances when an issue occurs.
* **Alert mechanism**, In cases where manual review is necessary due to an exception, the student is informed

# Uipath Bot activities used

### Data Extraction

Collecting data from various sources including the user

* **Data from the user**:

|  |  |
| --- | --- |
| ACTIVITY NAME | PURPOSE |
| Input dialog | *Get user’s student number and password for log in efundi then later email address* |
| Get Credential | *Get Owners log in details (testing purposes) from Orchestrator assets* |

* **Data from EFUNDI web pages**

|  |  |
| --- | --- |
| ACTIVITY NAME | PURPOSE |
| Use browser Firefox | *Browse Efundi page* |
| Extract table data | *Extract data URLs for efundi sites announcements, “test and quizzes”, assignments and all assessments due dates,* |
| For each row in a data table | *Loop through all rows saved in the data table and use the data* |
| Navigate browser close tab | *Avoid multiple unnecessary open tabs* |

* **Data from excel**

|  |  |
| --- | --- |
| ACTIVITY NAME | PURPOSE |
| Excel Application Scope | *For sequence of excel activities organized inside it.* |
| Use excel file | *Directing the bot to the excel file* |
| Read Range | *Reading the URLs to efundi sites web pages, announcements, “test and quizzes”, assignments and all assessments due dates* |
| Close workbook | *Control the use of excel files among activities* |

* **Data from the local folder**

|  |  |
| --- | --- |
| ACTIVITY NAME | PURPOSE |
| Open Browser | *Get URL to the Due Date Dynamo web for visualization* |

### Data Consolidation

Microsoft Excel and local machine folders were used as a storage mechanism for all scrapped assessment due dates and outputs from the bot

* **Save output data from the bot to the folder**

|  |  |
| --- | --- |
| ACTIVITY NAME | PURPOSE |
| Try catch | *Catch unregular performance and input during execution* |
| Take screenshot and save image activities | *Save the screenshot on the local machine folder for manual review* |

* **Save all scraped data to excel files**

|  |  |
| --- | --- |
| ACTIVITY NAME | PURPOSE |
| Excel Application Scope | *For sequence of excel activities organized inside it.* |
| Use excel file | *Directing the bot to the needed excel file to save to* |
| Read Range | *Reading the URLs to efundi sites web pages, announcements, “test and quizzes”, assignments and all assessments due dates* |
| Close workbook | *Control the use of excel files among activities* |
| Write Range Workbook | *Writes the due dates from the data tables to the excel file* |

### Reminders

Sending reminders through outlook to respective students

|  |  |
| --- | --- |
| ACTIVITY NAME | PURPOSE |
| Sequence and if activities | *The right sequence of activities is crucial then the if activity will to check the current dates then check if it falls on which interval ( 1 week before,3days before or 1 day before the deadline).* |
| Send Outlook mail message | *Direct the reminder to the email entered by the user* |
| For each row in a data table | *Loop through the data table to check the due dates then calculate how far is that date to current date* |
| Assign | *Assign the differences among dates to a variable* |

### Visualization

A new created web “Due Date Dynamo” where students can view all upcoming deadlines

|  |  |
| --- | --- |
| ACTIVITY NAME | PURPOSE |
| Open browser | *Opens the web page used for better visualization to the students* |
| Message box | *Instruct the user on why they see a pop-up web and what they should do* |
| Try catch | *Control invalid operation exceptions* |

# Reports

### Design decisions report

#### **Data source identification**

The first stage of the project involved the identification of various sources od assessment deadlines within the university’s systems(efundi). I conducted a thorough review of the platform used for disseminating assessment related information and identified the following sources:

* **Efundi announcements, assignment &”test and quizzes”**: this web pages are used by lectures to inform, announce and post assessments detail these platforms were my primary source of assessment deadlines

#### **Data extraction techniques**

Extracting data from these sources I employed a combination techniques and tools; this includes web scraping methods as UiPath provides built in activities for web interactions. I developed custom workflows to navigate the efundi web pages sections on the above sources’ tabs, identified relevant deadlines and extract the associated information.

The plan I implemented was to get the URLs to pages I want to navigate first then go to those pages to do web scraping.

Data scrubbing

Data I received for announcements section was long text messages which I then had to store all of them then go through all of them extracting sections that talks only about the due dates of assessment using Regular expressions website called RegEx101.com in simple terms I had to do data cleaning by extracting only certain patterns of a string. Then finally convert all the dates in strings to data formats to save them along with the URLs, status and name of the assessment.

Lastly all the due’ dates extracted and their related information were stored in one excel file

#### **Processing**

Processes included was to use the UiPath activities and visual basic coding to calculate the differences between the current dates to the due dates, get the current date, get the interval dates (week,3 days& 1 day before the deadline). Read the final due dates excel file then sent the appropriate reminder to the respective student with details of the assessment

#### **Design overview**

### Challenges encountered and implemented solutions report

* None of the data I got was exactly how I needed. The solution was to implement data scrubbing and methods like using RegEx101 website to get certain portions of the strings and visual basic coding to convert strings to date format
* Some modules sites don’t have “test and quizzes” page. The solution was to firstly check if the data to be scarped is available otherwise skip with the use of ‘if’ and try catch activities
* Many browsers opening and slowing down the machine. Same solution, close tab after the execution of the activity
* “Another process is using the excel file”, since many activities shared some file to execute their functions ended up causing conflicts. The solution was to piece certain information on separate files then in the end combine all the related data in one file other solution was to close the workbooks immediately after the execution of an activity

### Improvement Ideas

* Add and make use of charts on visualization for deadlines
* Improve security of student’s credentials
* Update this bot to create a monthly/weekly (different frequencies) report on the grades and performance of the student compared to previous performance to help them analyze their progress I add e better visualization mechanism for them to view
* Add application assistant Bot for the university

The bot will update the applicants with the application process immediately when there is a change (for example to add more documents asap because the applicant may not always be aware) then add a chatbot on the application to answer frequent questions

This will simplify the application process and reduce administrative burdens on the application’s admins

# AS IS process

1. Data Extraction:

#### **Data Sources**:

eFundi Announcements

efundi test and quizzes

efundi assignments

**Data Extraction Techniques**:

eFundi Announcements: Manual login to eFundi -> Navigate to announcements -> Manually search for and extract assignment deadlines.

University Email System: Manually check emails -> Identify assignment-related emails -> Manually record assignment deadlines.

Data Consolidation:

**Storage**:

Recorded assignment deadlines from various sources are only found on the efundi web pages.

Reminders:

**Reminder Creation**:

For each assignment deadline, manually set reminders using a personal calendar application and efundi announcements.

### **Visualization**:

**Creating Visual Tracker:**

Manually view all recorded assignment deadlines on efundi pages

### Exception Handling:

Handling Errors:

In case of encountering emails with unrecognized formats or navigating to course pages that cannot be automated, a screenshot is taken manually, and the student is alerted for manual review.

# TO BE process

Objective: To automate the tracking and management of assignment deadlines for university students by consolidating data from various sources, sending reminders, and visualizing upcoming deadlines.

**Participants**:

RPA Bot

University Students

Data Sources (eFundi, Emails, PDFs, etc.)

**Key Steps:**

Data Extraction:

RPA Bot identifies sources of assignment deadlines, including eFundi announcements, test and quizzes & assignments

RPA Bot scrapes project/assessment due dates from the above sources.

Data Consolidation:

RPA Bot uses excel spreadsheet as a storage mechanism

RPA Bot stores all scraped assessment due dates in the excel spreadsheet

Reminders:

RPA Bot schedules reminders to be sent to students at the following frequencies:

One week before the deadline

Three days before the deadline

One day before the deadline

Visualization:

RPA Bot creates a user interface for students to view all upcoming deadlines by using a simple website Due Date Dynamo

The interface includes color-coding table rows for deadlines:

Green (more than 5 days left)

Yellow (3-5 days left)

Red (less than 3 days left)

Exception Handling:

If the RPA Bot encounters a course page it cannot navigate or an unrecognized email format, it captures a screenshot.

The bot alerts the student for manual review, providing the screenshot for reference.

**Inputs:**

Data sources with assignment deadlines

Student preferences for reminder timing

Exception handling criteria

Login credentials and email address

**Outputs:**

Stored assignment deadlines

Reminder notifications to students

User interface for deadline visualization

Exception alerts and screenshots for manual review

**Key Benefits:**

Reduction in missed submissions and student stress

Efficient tracking of assignment deadlines

Improved visibility of upcoming deadlines

Exception alerts for manual intervention

# Glossary

The main terms used in the Solution Document definitions:

**Workflow** - a part of the package; it contains some of the project logic. The workflow may take the form of a state machine, sequence, or flowchart. In the project folder, a workflow is saved as an.xaml file. An initial workflow file will run by default when the package is executed, and a workflow file can be called from another workflow.

**Activity** - actions executed by the Bot.

**Sequence** - a process in which activities are carried out in a particular order, one after the other.

**Orchestrator** – an enterprise architectural server platform that supports asset management, queue/robot workload management, remote control, centralized scheduling, reporting, auditing, and monitoring tools. JESUS

# Referrence list

Davenport, T. H. (2018). The rise of Robotic Process Automation. Harvard Business Review.

Marques, J., & Urbani, J. (2019). Robotic Process Automation: The next transformation lever for shared services. Harvard Business Review.

Miers, D. (2017). RPA: A journey from scripting to AI. Harvard Business Review.

Papp, R., & Tanczos, B. (2018). Robotic Process Automation in Shared Services: Lessons from Case Studies. Harvard Business Review.

Silver, B., Lacity, M., & Remko, v. D. W. (2016). Robotic Process Automation in the Shared Services Model. Harvard Business Review.

Sutherland, J., & Butts, C. (2019). Robotic Process Automation: Are you ready? Harvard Business Review.

UiPath. (2019). Accelerating digital transformation with RPA: Insights from Harvard Business Review. Harvard Business Review.

Lacity, M. C., & Willcocks, L. P. (2017). Robotic Process Automation and Risk Mitigation: The Value of Trade-Offs. Harvard Business Review.

Smith, A. N., & Bailey, M. (2018). Robotic Process Automation: A Path to Value. Harvard Business Review.

Wortmann, F., & Willcocks, L. P. (2019). Reshaping Work with Robotic Process Automation. Harvard Business Review.

Dhar, V., & George, J. (2018). The new frontier of process innovation: Robotic process automation. Harvard Business Review.

Sharma, M., & Choudhary, A. (2019). A Review of Robotic Process Automation and its Adoption in Business Process. Harvard Business Review.

Khurana, A., & Singh, S. (2017). Robotic Process Automation in Finance: Opportunities and Challenges. Harvard Business Review.

Chui, M., Klein, P., & Knott, D. (2016). Eight business technology trends to watch. Harvard Business Review.

Tien, S. L. (2018). Robotic Process Automation and the Finance Function of the Future. Harvard Business Review.

Lee, A. S., & Lee, C. K. (2019). Robotic Process Automation (RPA) in Finance and Accounting. Harvard Business Review.

Thiry, A. (2017). Robotic Process Automation and Shared Services: A Perfect Fit. Harvard Business Review.

Schatsky, D., & Werne, B. (2017). Robotic Process Automation: A Path to the Cognitive Enterprise. Harvard Business Review.

Narasimhan, L., & Ewusi-Mensah, K. (2018). Robotic Process Automation in Banking: The Road Ahead. Harvard Business Review.

Menon, V., & Rajan, M. (2019). RPA in Human Resources: Transforming Talent Management. Harvard Business Review.

Chandrasekaran, A., & Saravanan, S. (2017). Robotic Process Automation in Healthcare: An Overview. Harvard Business Review.

Gokhale, S., & Prasad, V. R. (2016). The Role of Robotic Process Automation in Supply Chain Management. Harvard Business Review.

Raghavan, A., & Rao, S. K. (2019). RPA in Customer Service: Enhancing the Customer Experience. Harvard Business Review.

Sodhi, M. S., & Soni, G. (2017). Robotic Process Automation in Logistics and Transportation. Harvard Business Review.

Sethi, V., & Nair, R. (2018). Robotic Process Automation in Marketing: A Case Study. Harvard Business Review.

Verma, N., & Jain, A. (2016). Robotic Process Automation in E-commerce: Challenges and Opportunities. Harvard Business Review.

Nambiar, A., & Raj, K. (2019). Implementing RPA: A Case Study in the Telecom Industry. Harvard Business Review.