PROJECT

BY

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1) Description and features:

Our mail server application allows the communication between different users, as it allows them to create accounts and send or receive emails, delete emails or even mark them as starred or important. Our mail app allows the user to add or remove contacts to make it easier to communicate with them. It also allows users to create up to 8 user folders in order to filter certain messages.

2) Assumption:

We've put so many assumptions while working on this app, we've assumed that the user might forget their password so we've put an option to allow them to restore their password that, of course, if the user answers their safety question correctly to avoid hacking. We've also put an assumption to delete emails from trash folder if they are in trash for 30 days or more. Another assumption was when creating user folders; we've put a maximum number of folders to be created which are 8 folders. When adding attachments the maximum number of attachments is also 6 attachments. Users are also able to edit their contacts and we've put an assumption that a user may have more than 1 email address so when the user edits their contact email info with several email addresses, when sending an email, the email will be sent to all the email addresses. We've also enabled the user to delete the unwanted user folders. We've assumed that users may create multiple user folders with the same name which can't happen so a warning appears to the user telling them that the folder already exists. Users can also view the emails sorted according to subject, priority, date, etc… they can also search for emails according to subject, priority, date, etc… they can even search for a word inside an email.

3) Bonus parts:

We've implemented the app with a unique design to make it easier for users to use our application and enjoy using it we've also added many bonus features such as:

1-Animation: we've added an animation when sending and receiving emails.

2-Splash start: our app starts with a splash which make the app looks cooler.

3-Profile picture: there's a default profile picture for every user that signs up and every user can change their profile picture.

4-Forget password: we've added safety questions and answers in the signup form to allow users to restore their passwords in case of forgetting them.

5-Starred emails: we've put an option to mark important emails as starred.

6-Showing search results while typing (without clicking the search button).

7-Search inside an email: users can search for any word inside any email.

8-Showing attachments: when there's an attachment in the email we show the attachment to the user without having to click on it.

9-Send from draft: when saving an email in draft users can resend it at anytime.

10-Select all: users can choose to select all emails at the same time.

11-sound effects when receiving or sending messages.

3) Data Structure:

-To ensure the best performance and to reduce coding complexity we used:

1) Stack: we use stack in binary search and quick sort.

2) Queue: storing receivers emails in case of sending to several emails.

3) Arrays: showing emails in pages.

4) Linkedlist: we used it in many things such as:

1-storing mail information

2-saving attachments.

3-listing contacts.

4-saving all mails in a certain directory.

5) priority queue.

4)Main module:

Main logic classes of the project:

1-App: the class contains the main function of the project.

2-Contact: a class that holds the user's info.

3-Folder: contains some strings that define the path of the folder.

4-Filter: contains the search and sort keys.

5-Mail: contains the message info (sender, subject, receiver etc..).

6-Index to mail: converts the list of indices of chosen emails to a list of mails.

7-subtract days: responsible for deleting the message in trash after 30 days.

8-Forget password: responsible for returning the password back to the user in case of answering the safety question correctly.

9-New folder: responsible for creating user folders.

10-View messages: responsible for viewing the messages in the table while running the program.

5) Algorithms:

1) ***Binary Search***

```
binarySearch(Double Linkedlist of element , target)
    int left ← 0;
    int right ← size of element -1;
    create point (left,right);
```

```
ceate stack;
push point in stack;
while(left<=rihgt)
    left = stack.peek().x;
    right = stack.peek() .y;
    int mid = left + (right - left) / 2;
    if(mid == target)
        add mid in double linkedlist list;
        find first element previous mid has target value;
        find last element next to mid has target value;
        add this elements in list;
        return list;
     else if (mid < target) {
       left = mid + 1;
       create new point p = new Point(left, right);
       stack.pop();
       stack.push((Point) p);
    } else if (mid > target) {
       right = mid - 1;
       create new point p = new Point(left, right);
       stack.pop();
       stack.push((Point) p);
    }
End while;
Return empty double linkedlist;
```

2) ***Quickosrt***

type:public

return:void

parameters:(Doublelinked list,booleans)

this function sorts a given doublelinked list according to the give true boolean(target to sort the list on) using a stack

public QuickSortdl(Doublelinkedlist list,boolean subject,boolean sender,boolean priority,bool.....){

if(!list.isempty){

int startpoint <-- first index;

int endpoint <-- last index;

create new stack (order)

point range <-- (startpoint,endpoint)

order.push(range)

while(!order.isempty)

Point rangework <-- order.pop;

int st <-- rangework.x

int en <-- rangework.y

int pivot <-- partition(list ,booleans ....)

order.push(point(pivot+1,endpoint))

order.push(point(startpoint,pivot-1)

end of while

3) ***Partition***

type:public

return:int

parameters:(Doublelinked list,booleans)

this function takes a pivot and sort the list where this pivot will be in position where all elements on its right are gretaer than it and all the elements on its left are smaller than it

public partition(Doublelinkedlist list,int rangestart,int rangeend, boolean subject,boolean sender,boolean priority,bool.....){

int index <-- rangestart - 1

if(given boolean of target to sort on is true){

Mail pivotMail <-- (Mail)list.get(rangeend)

take tareget type in a variable of same type (target)

for(j=0;j<=rangeend-1;j++)

{

loop till the pivot is in its suitable position

}

replace the pivot with the last element larger than it

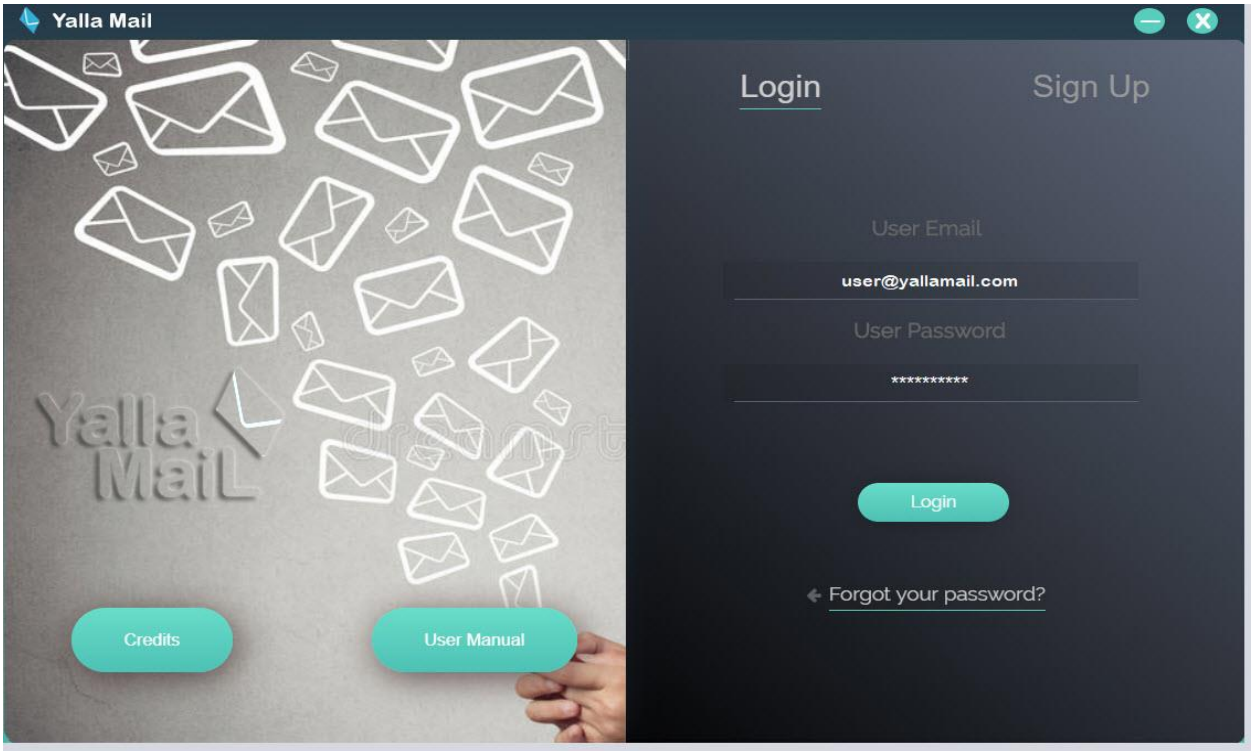
}

return position of pivot +1;

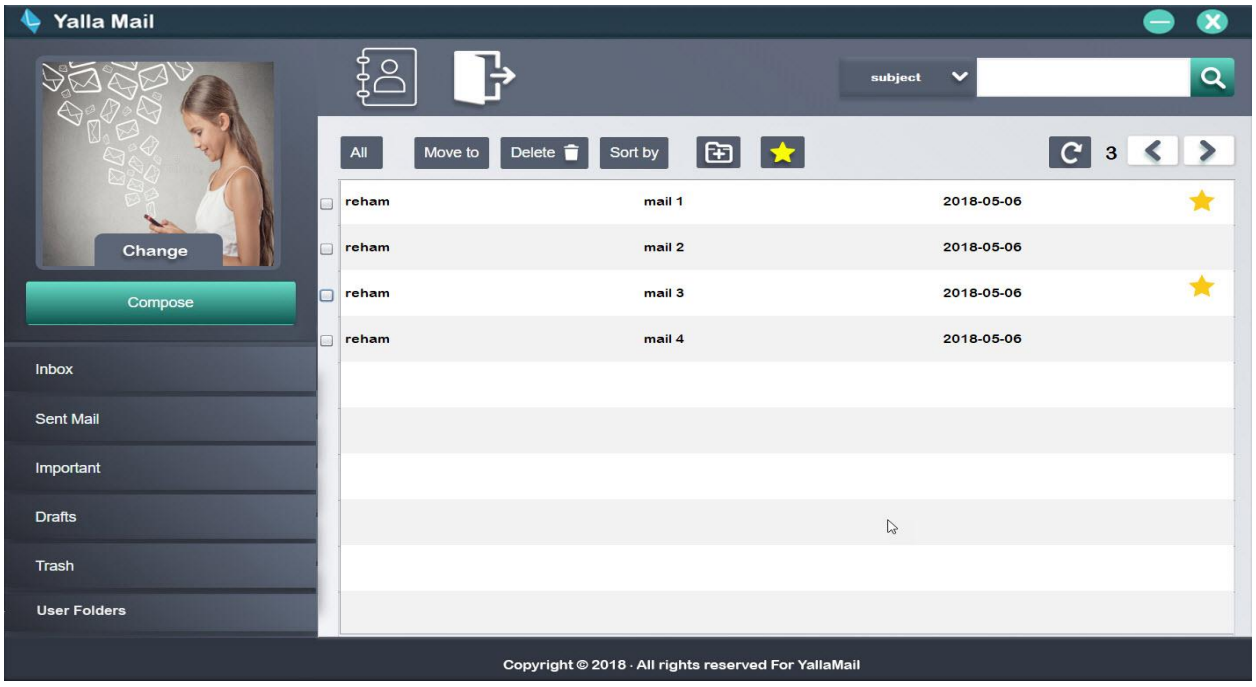
}

4) Sample Screenshots:

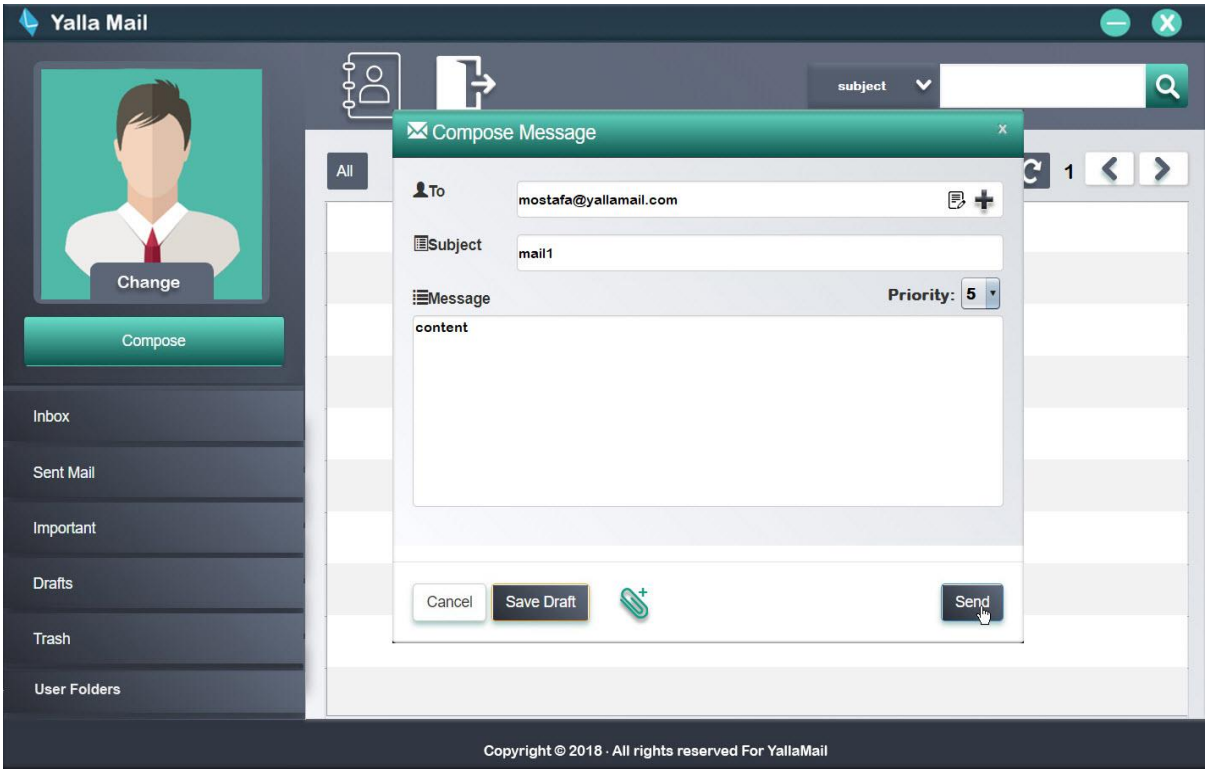
-First, the user logs into their account.



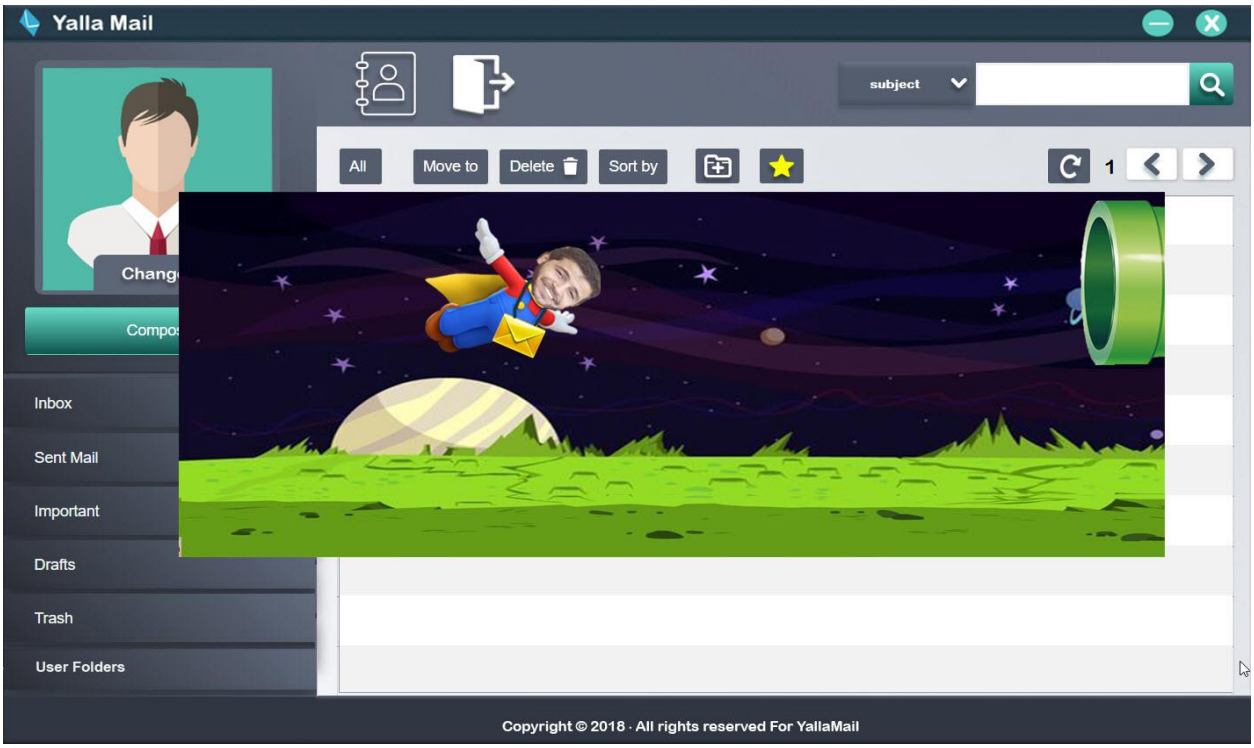
-Displaying the emails in a user folder.



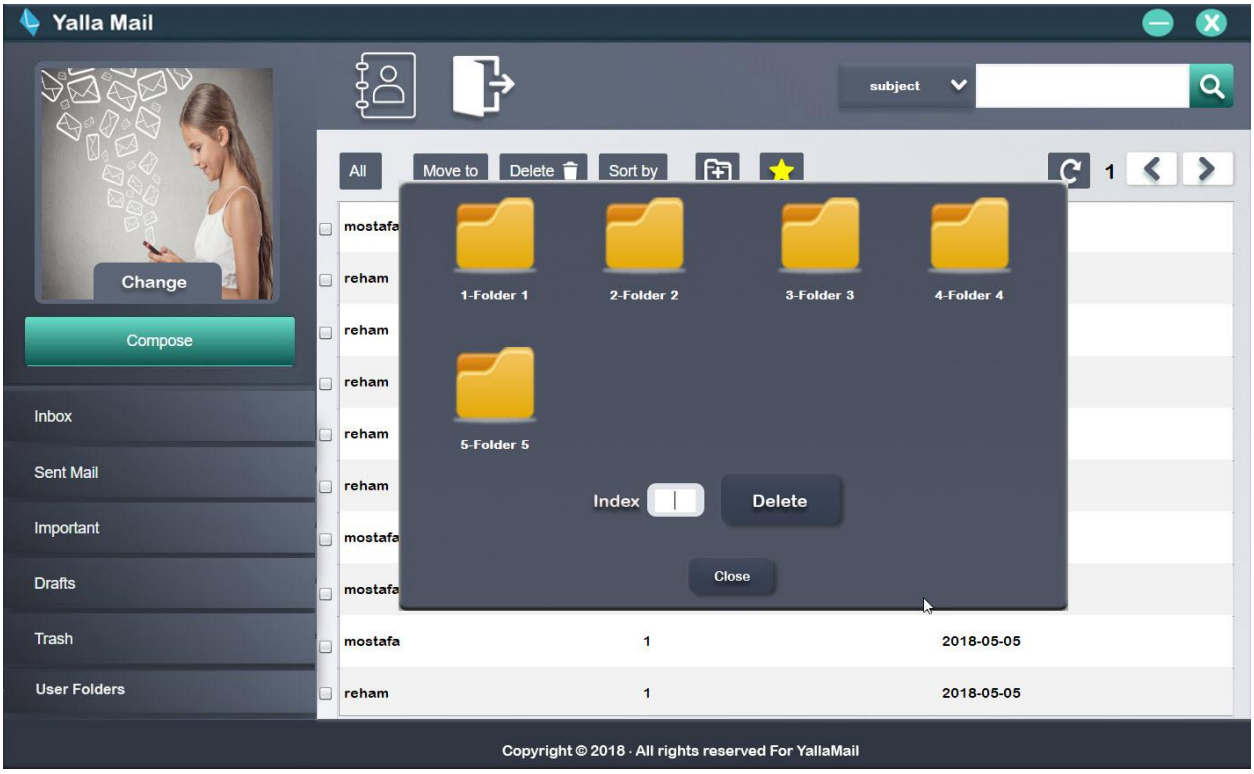
-Composing a new mail.



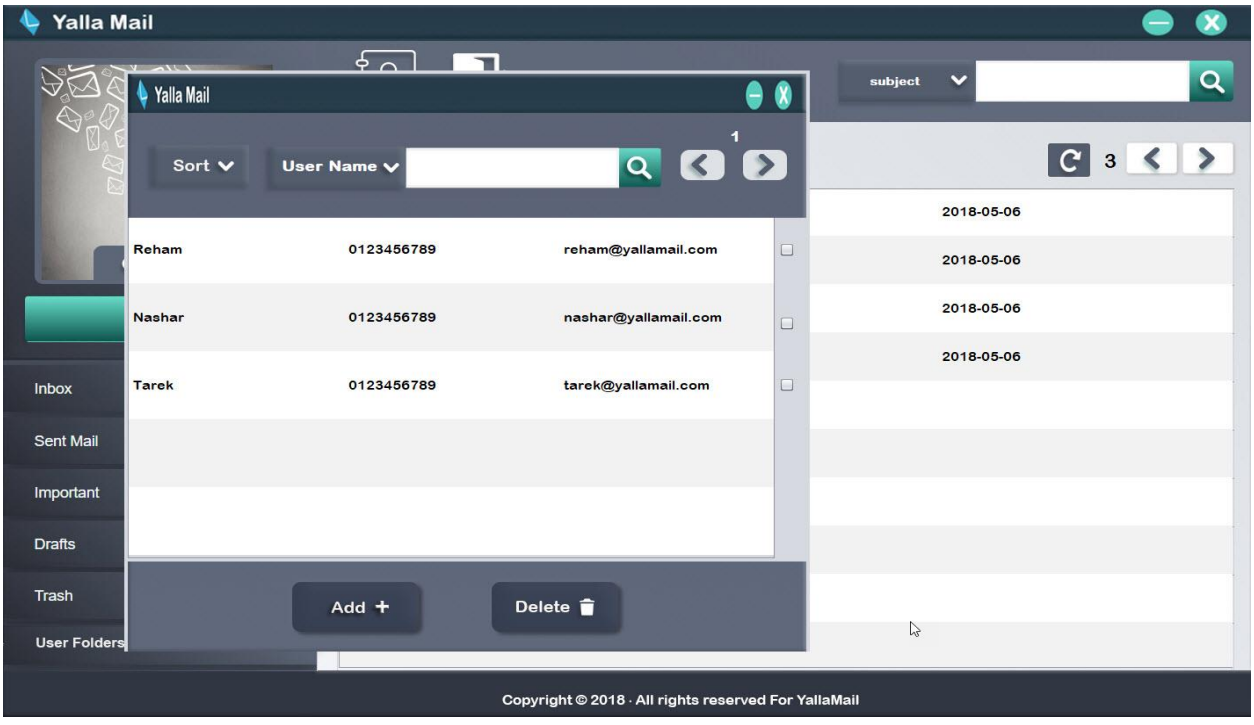
-Sending a mail .



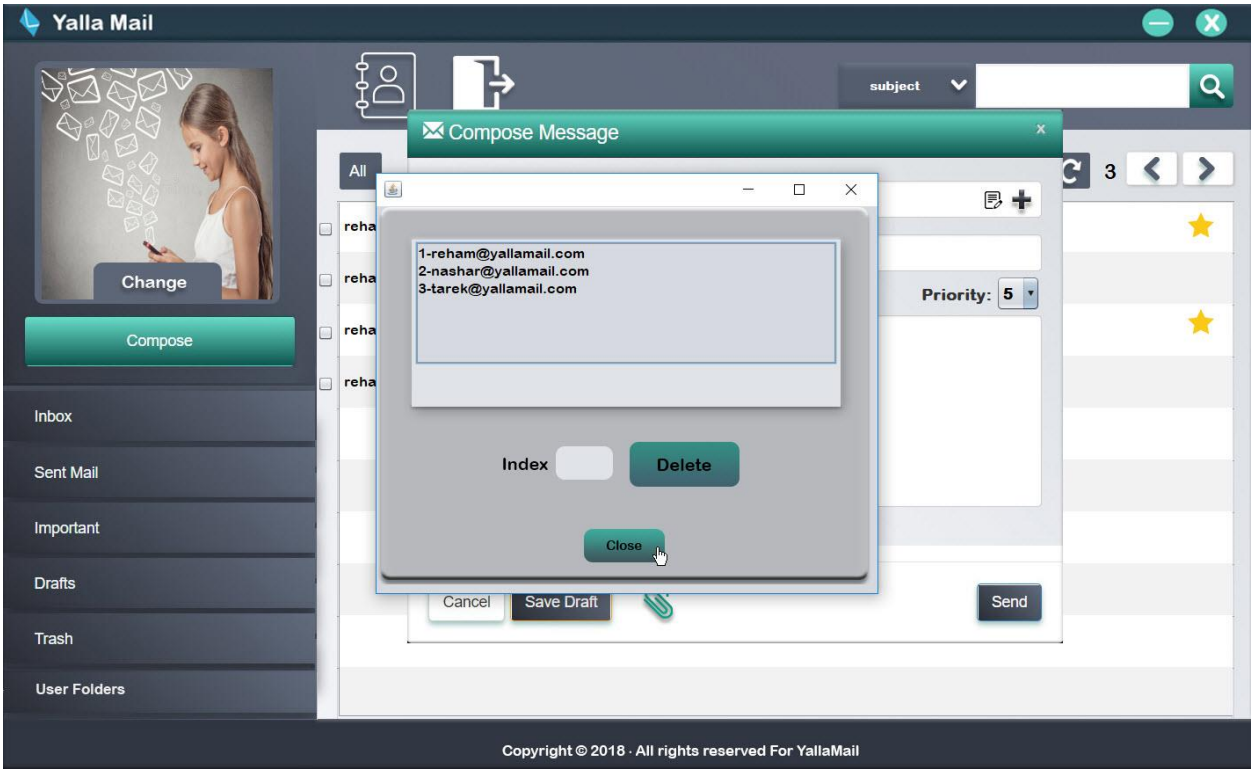
-Displaying user folders .



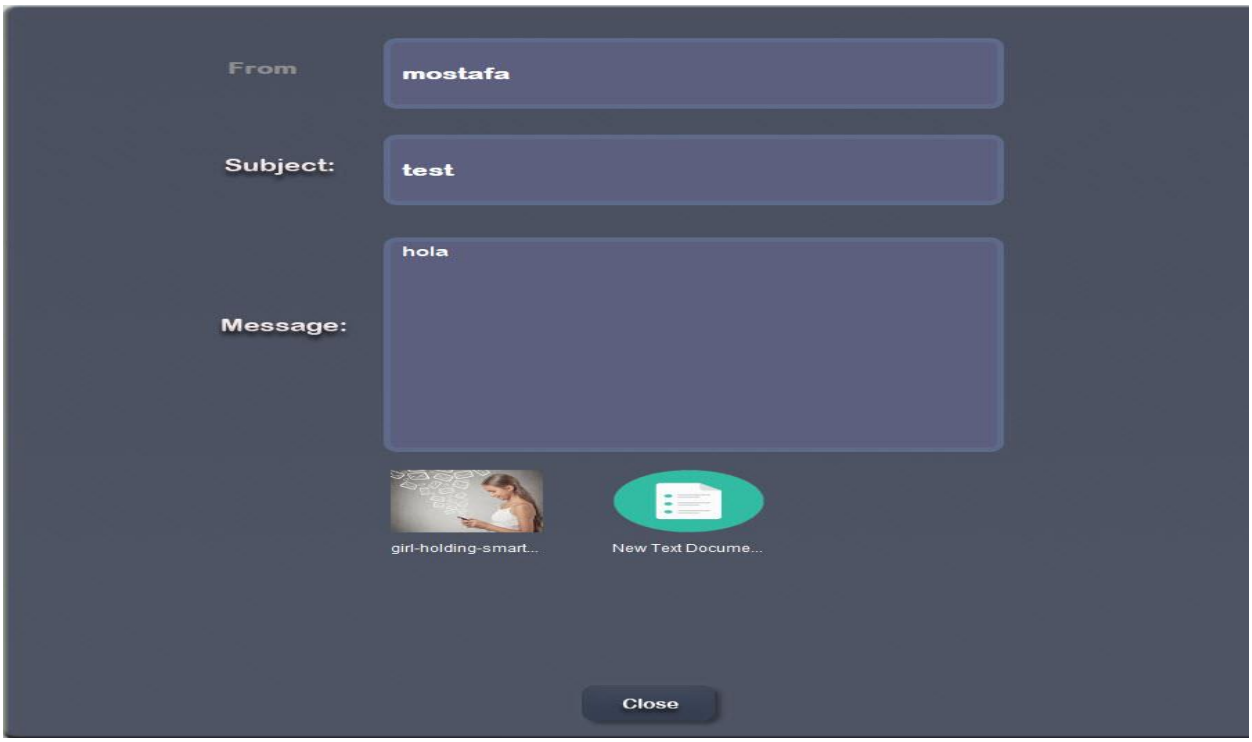
-User contacts .



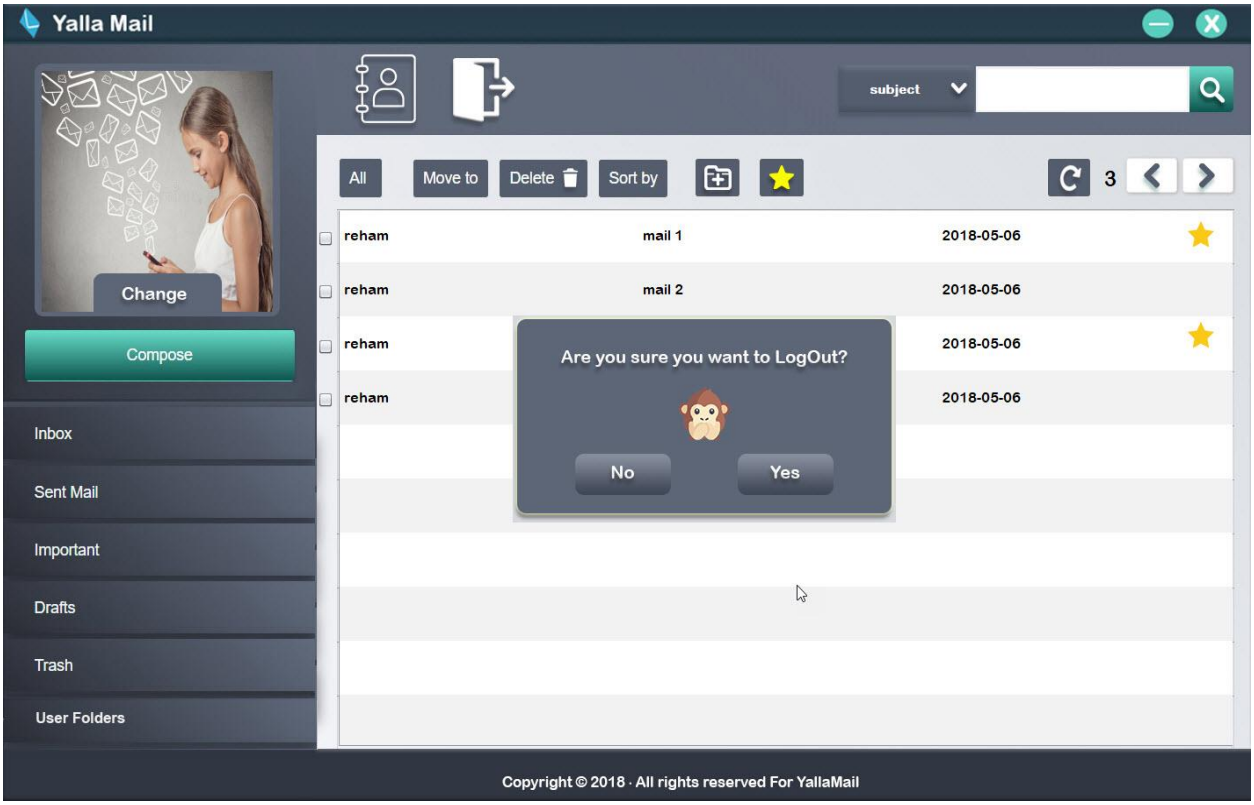
-List of receiver.



-Showing mail.



-Log out .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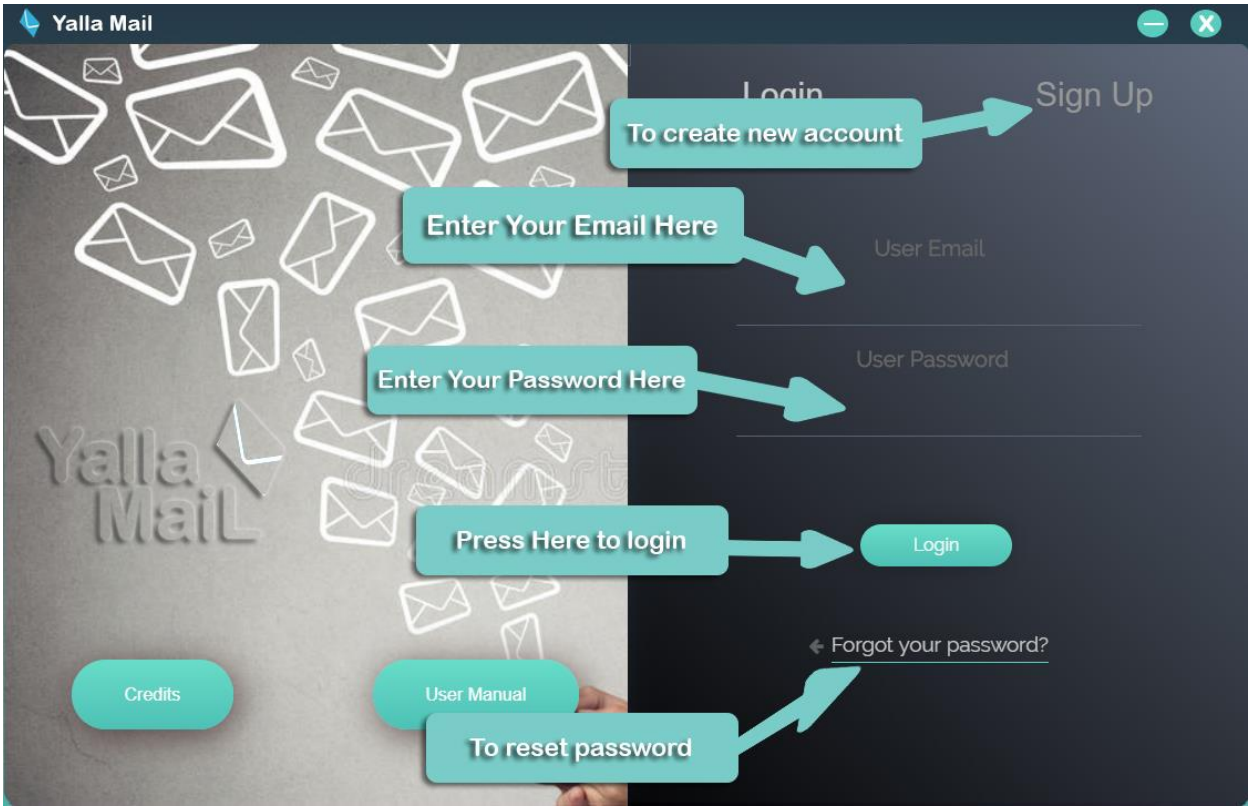
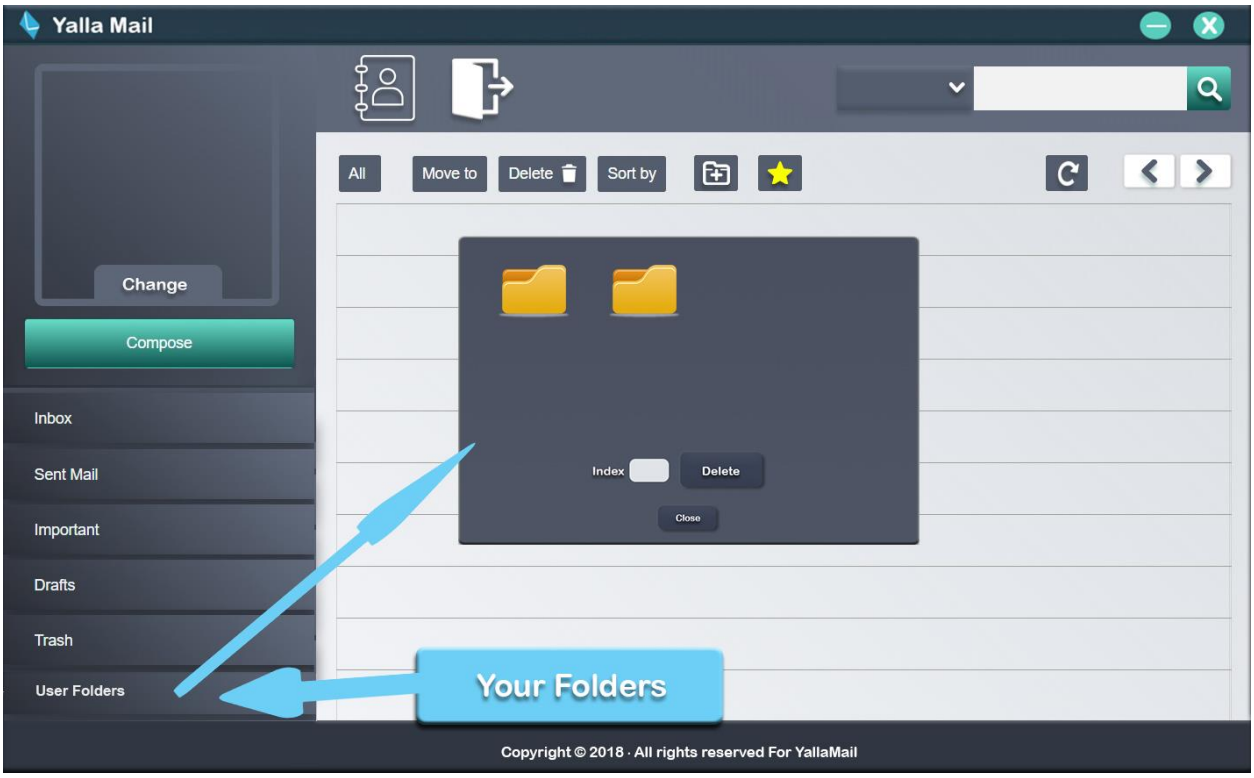
4) User manual:

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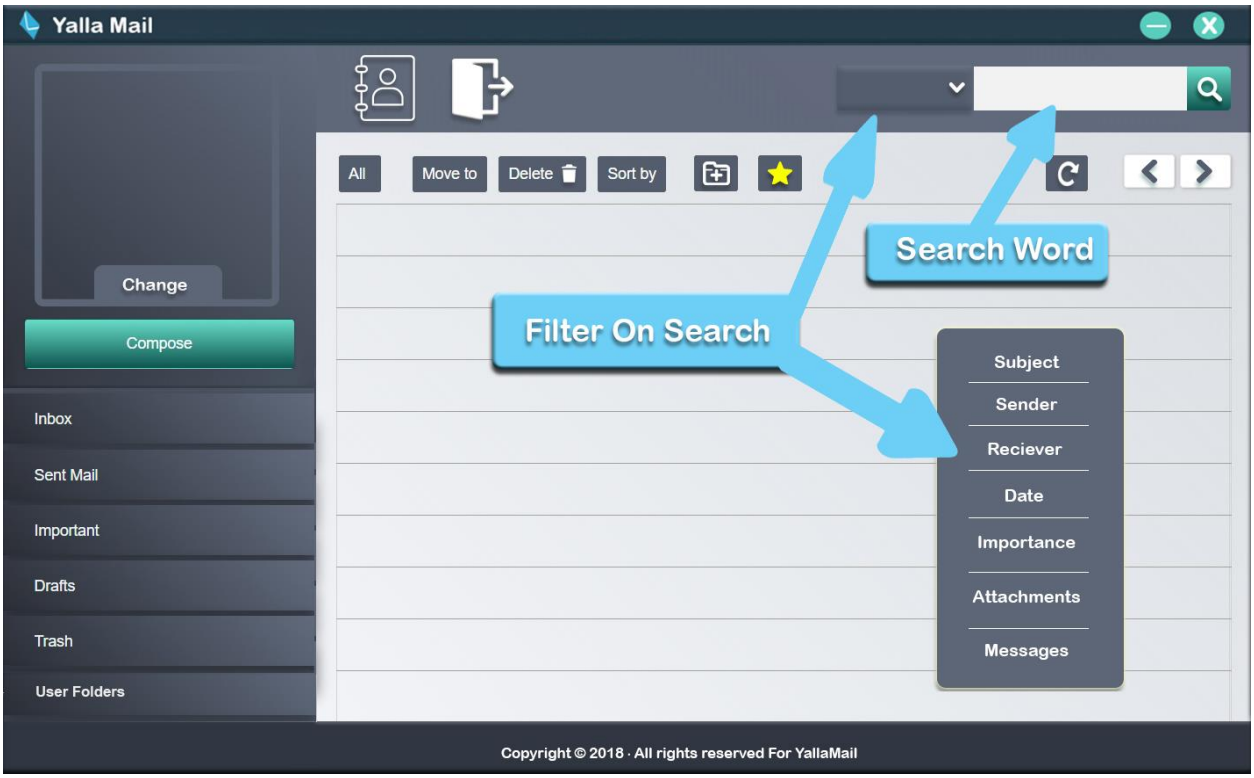
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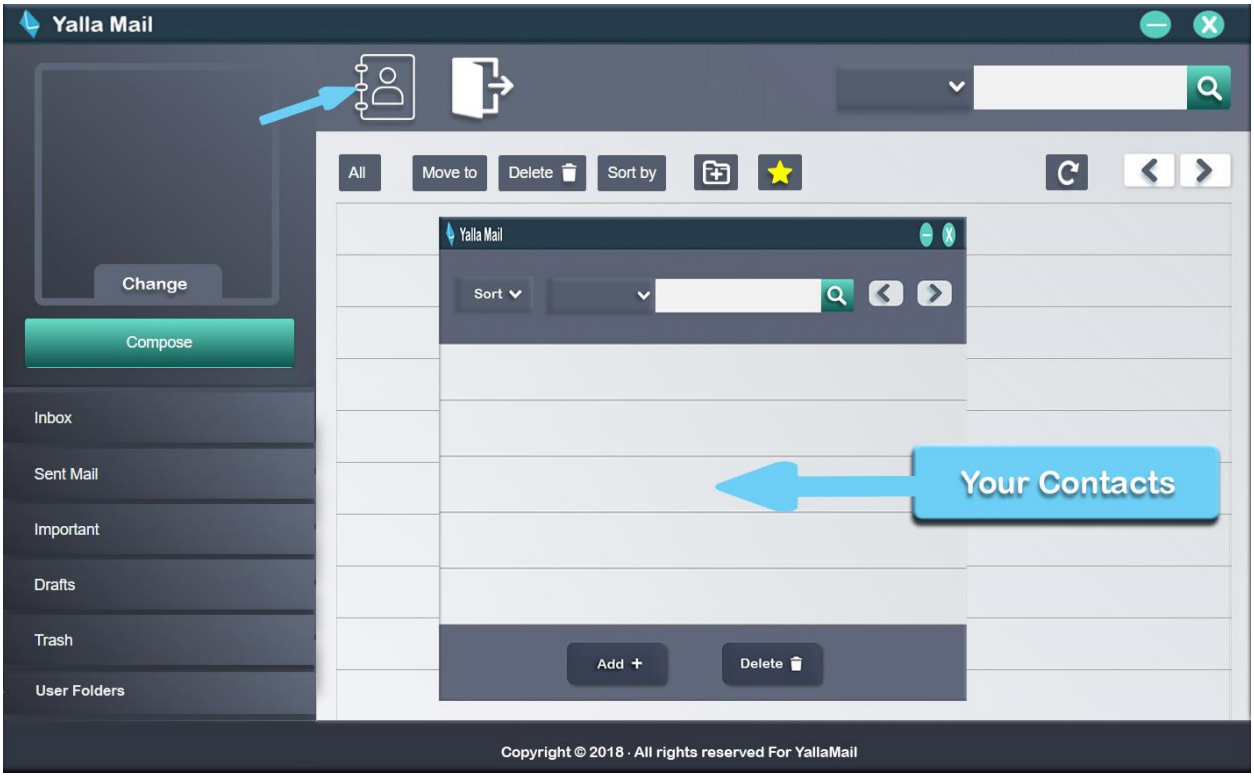
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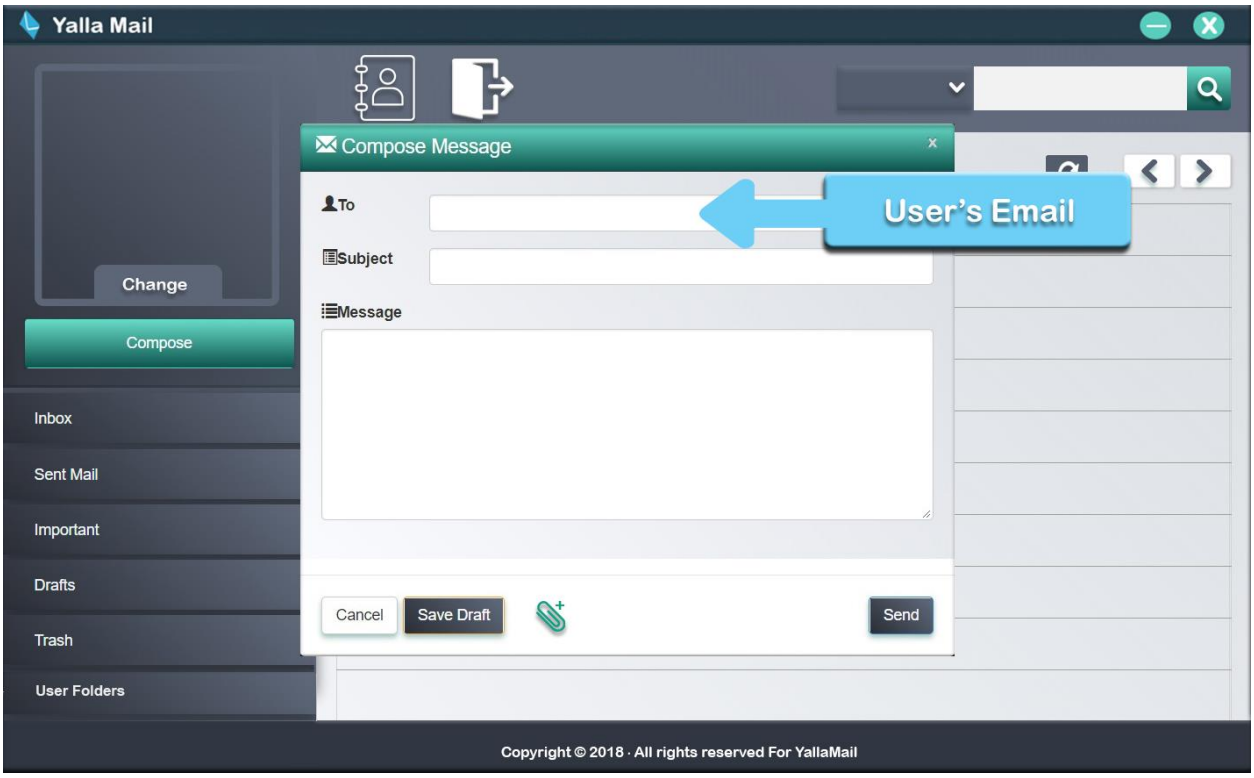
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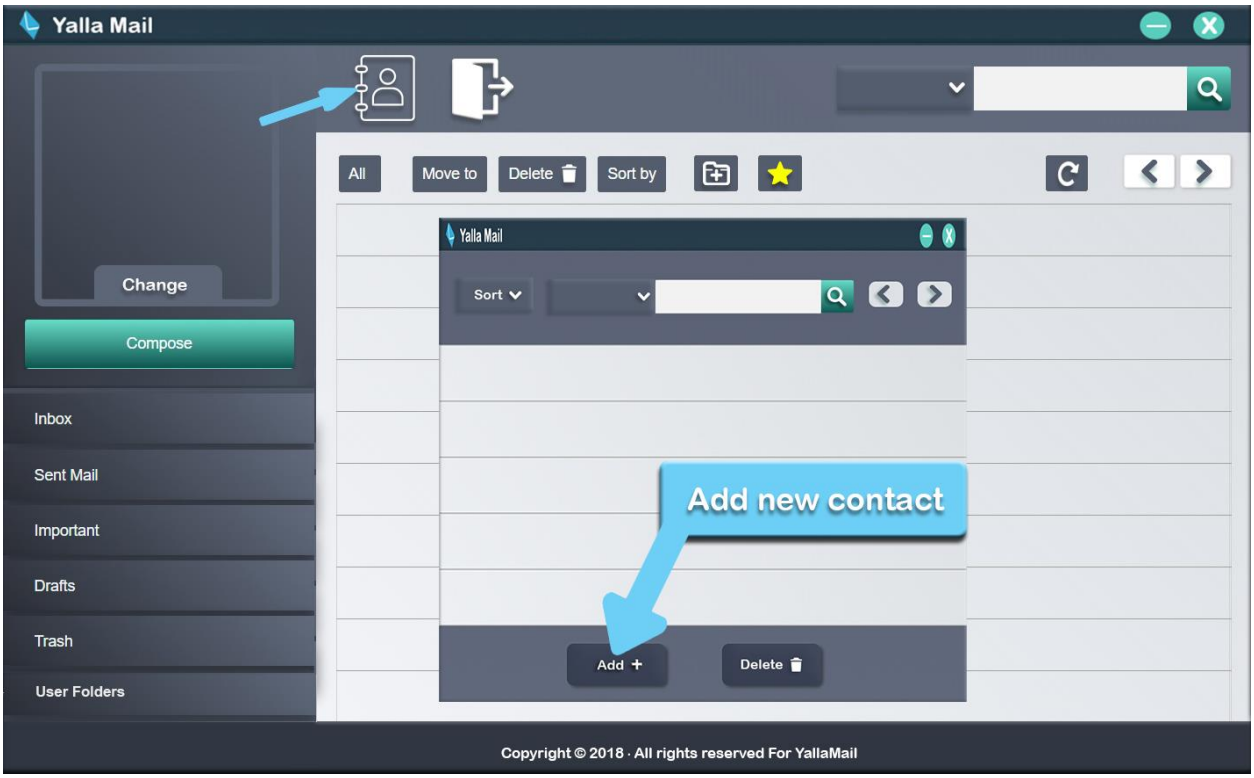
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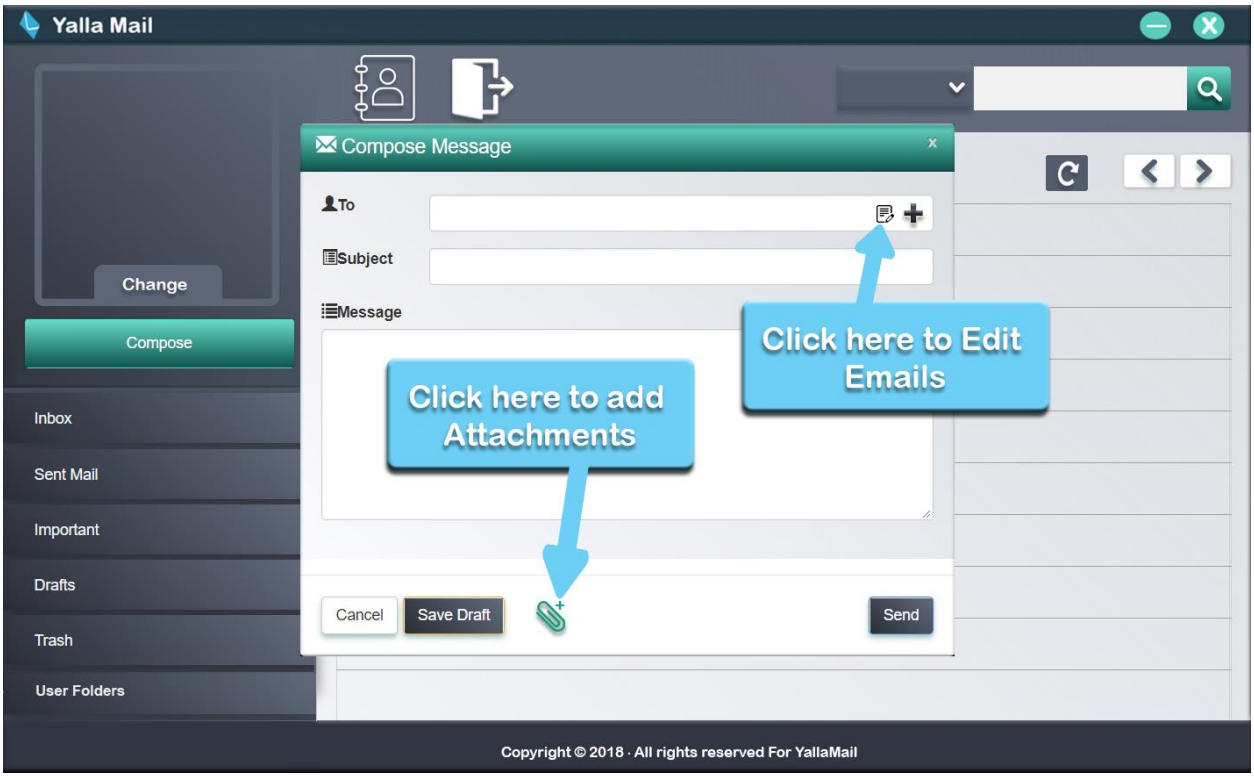
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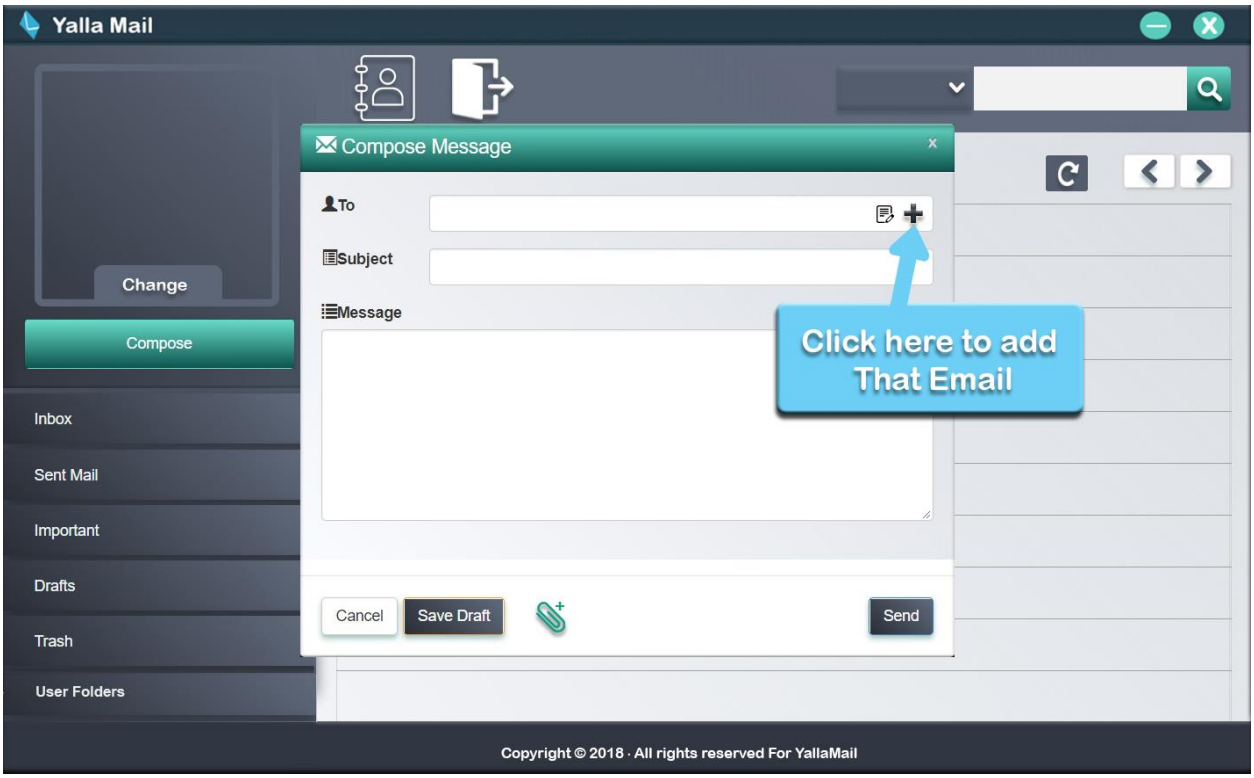
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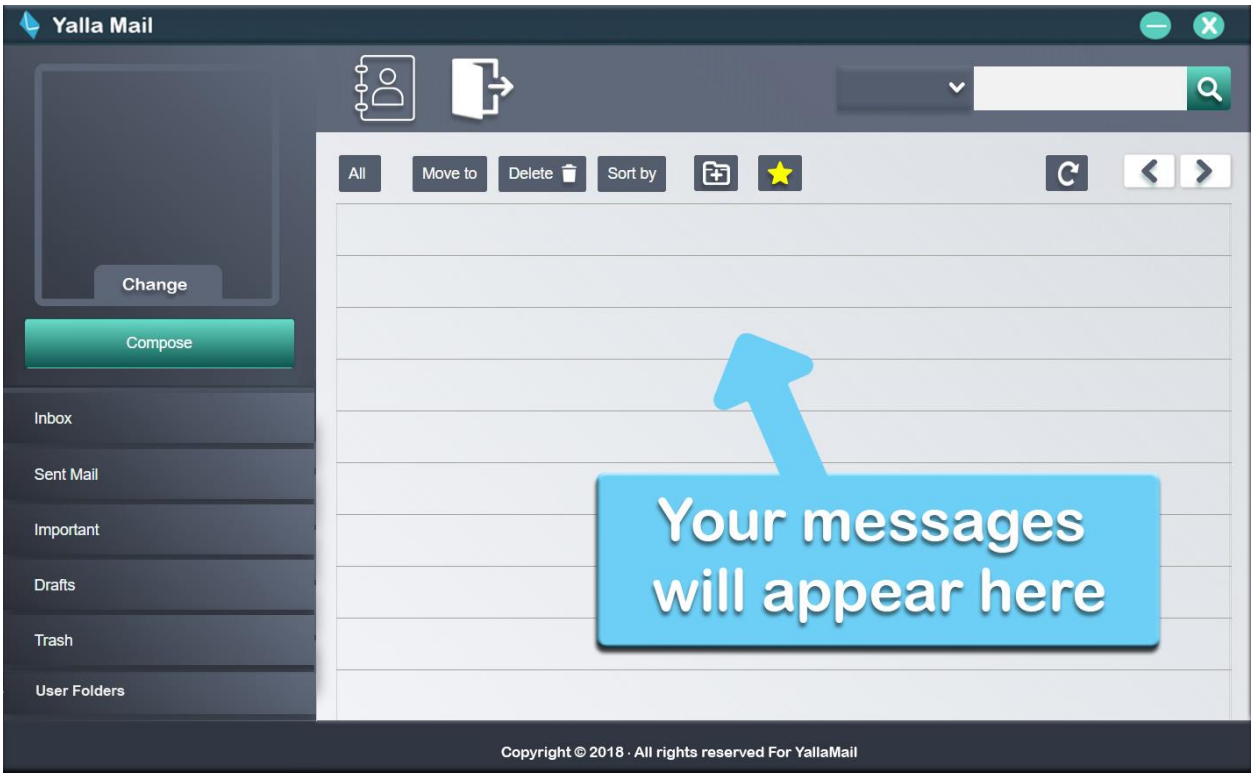
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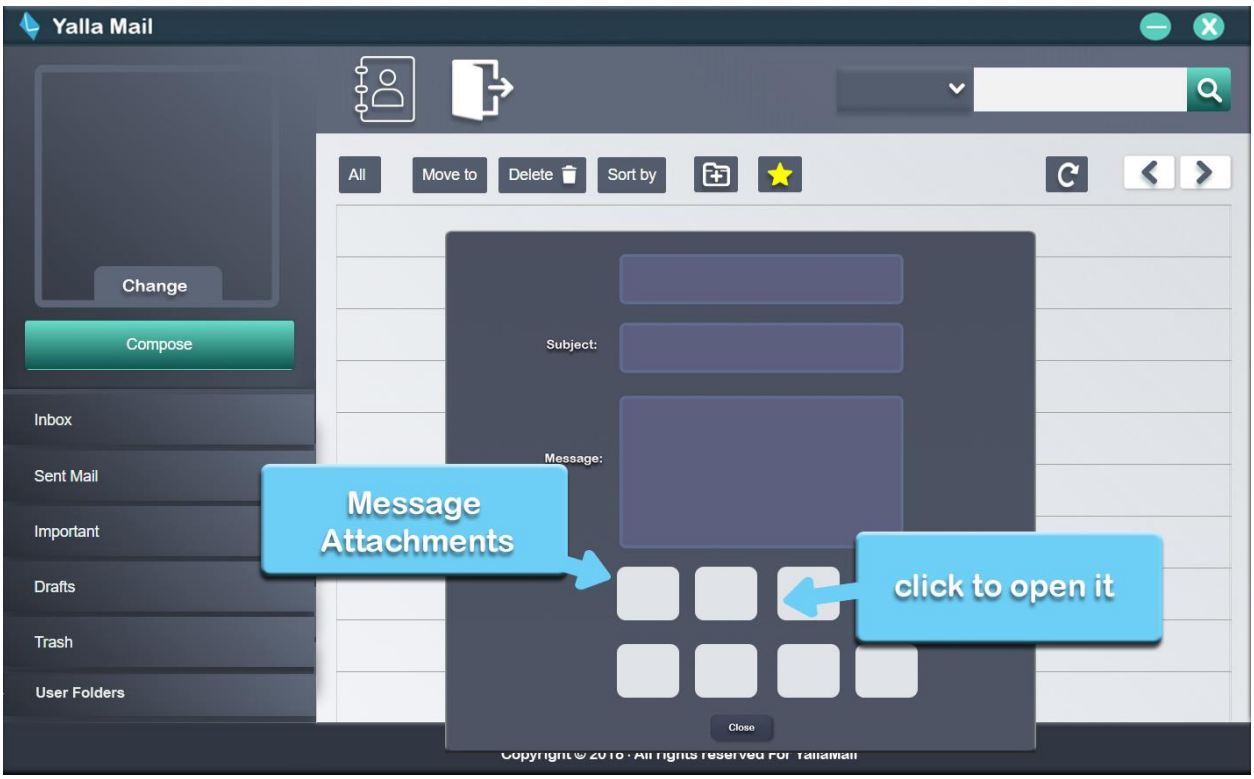
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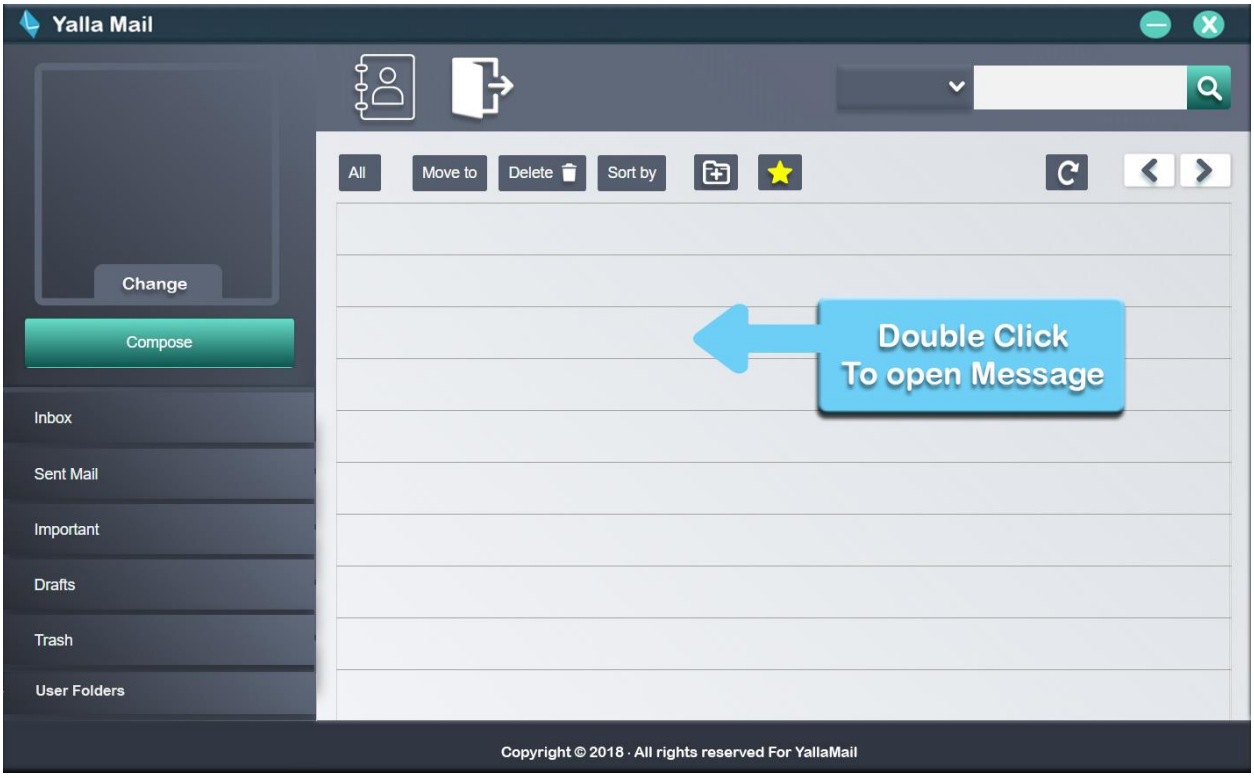
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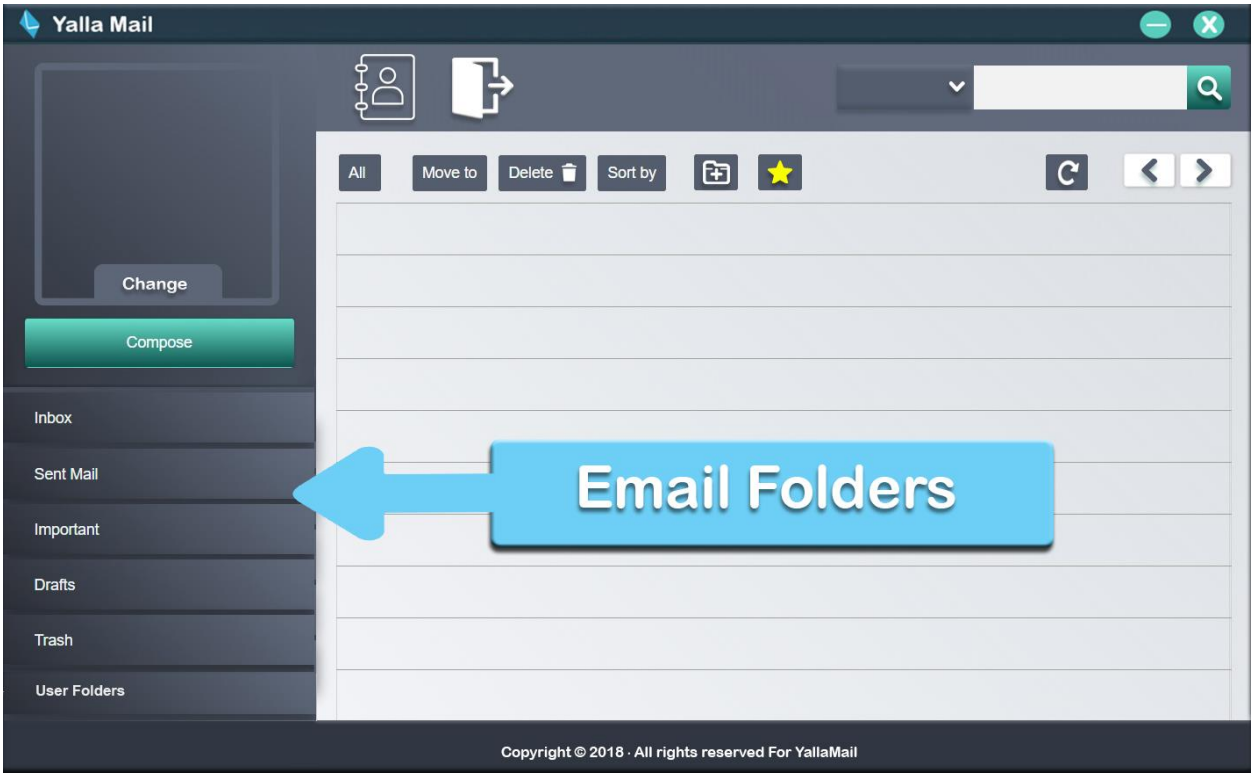
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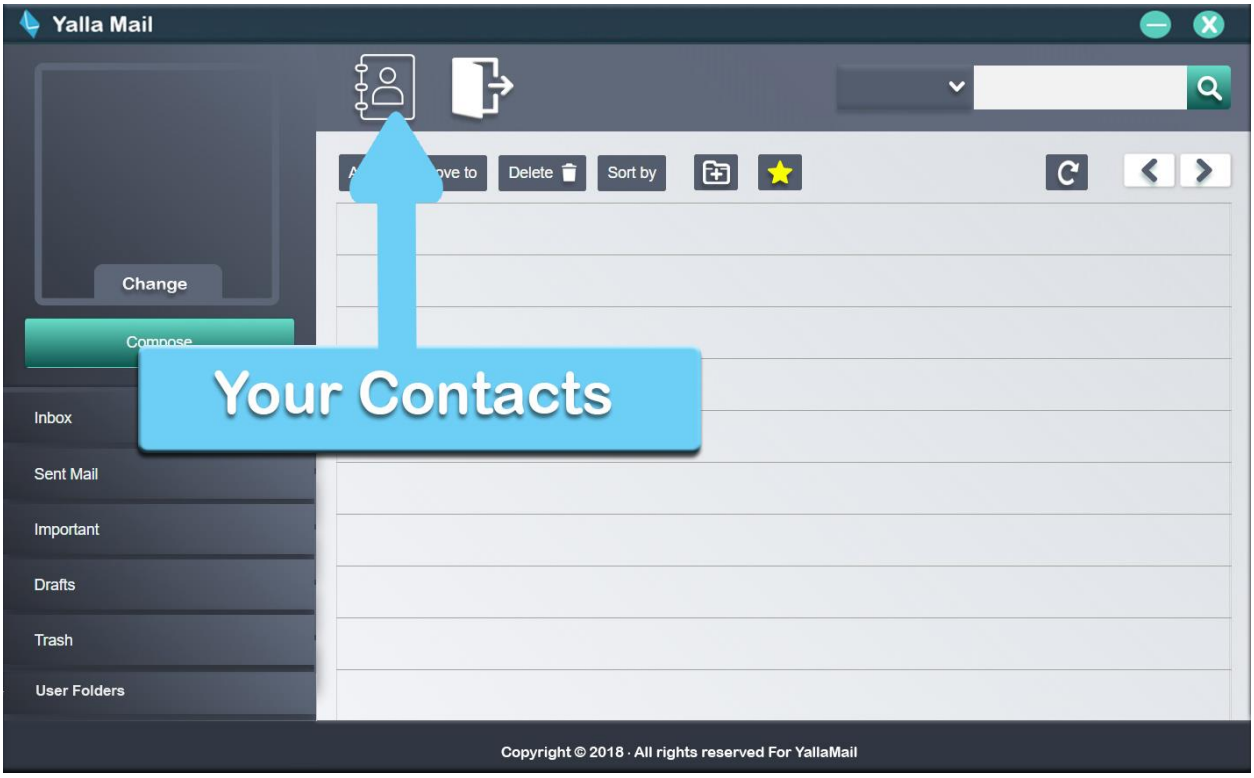
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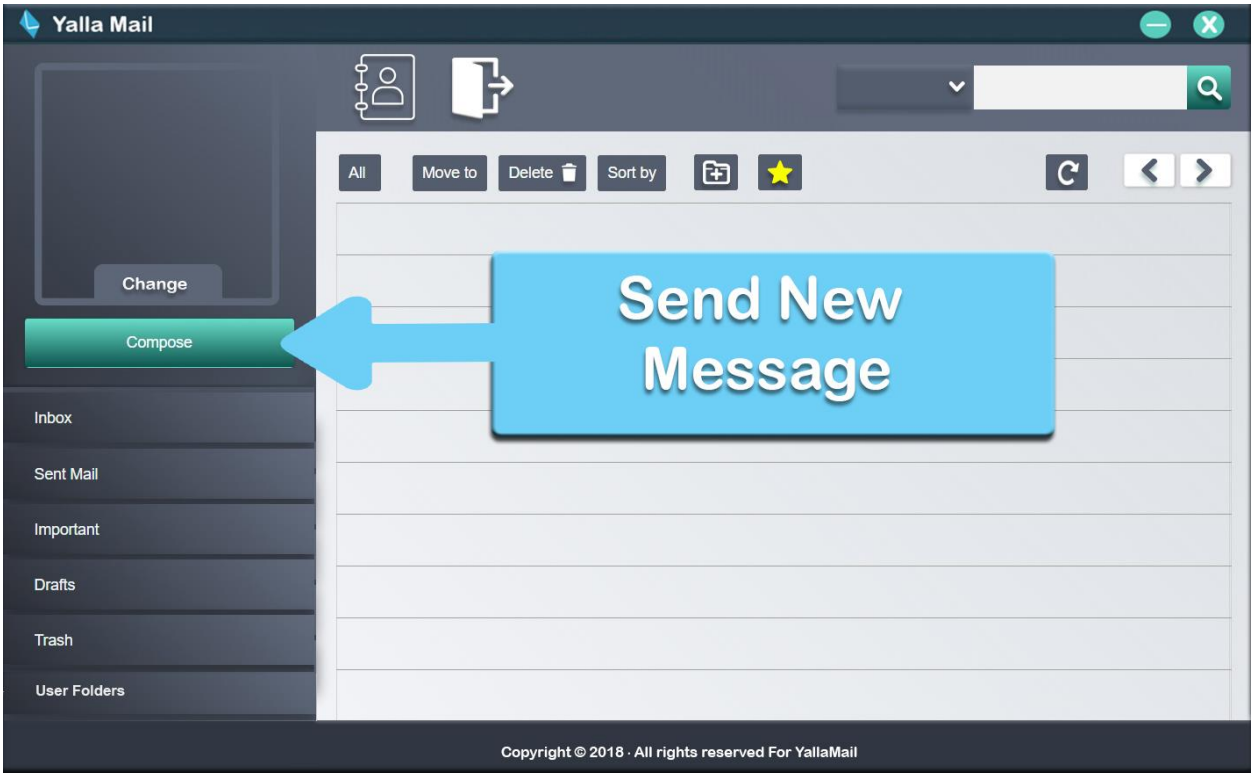
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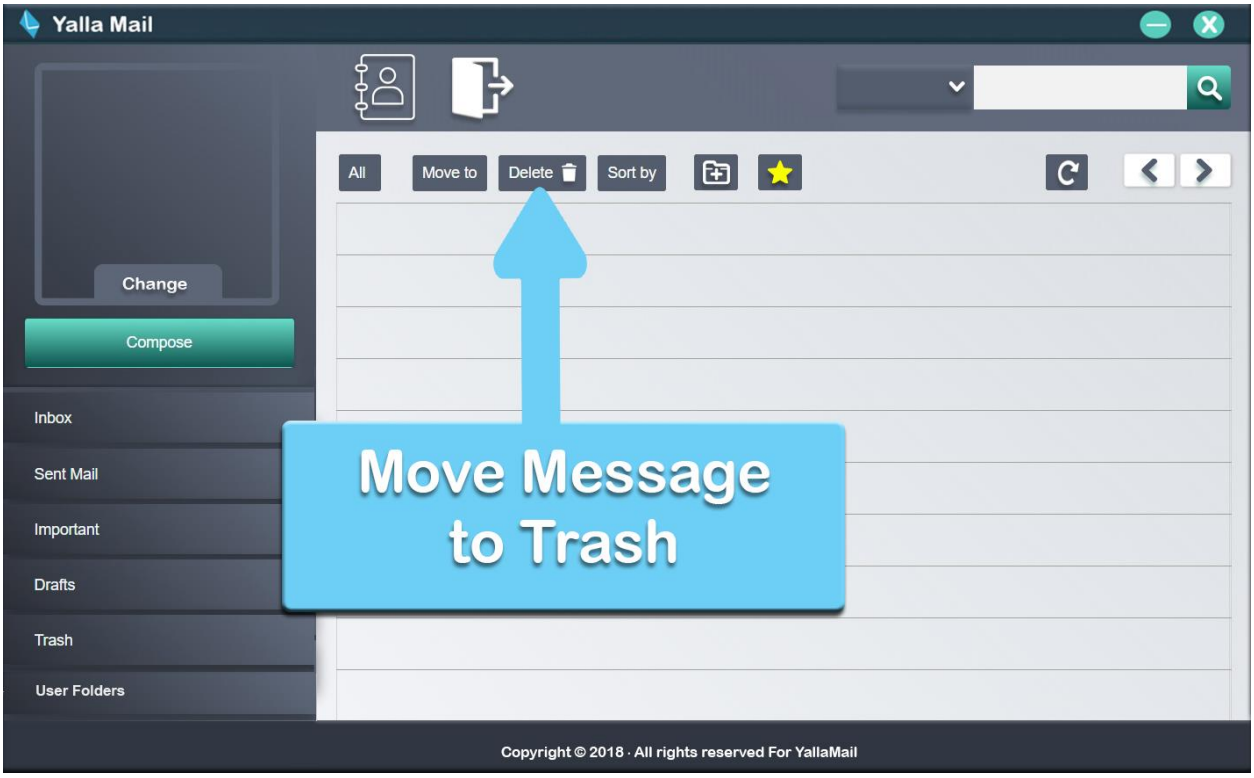
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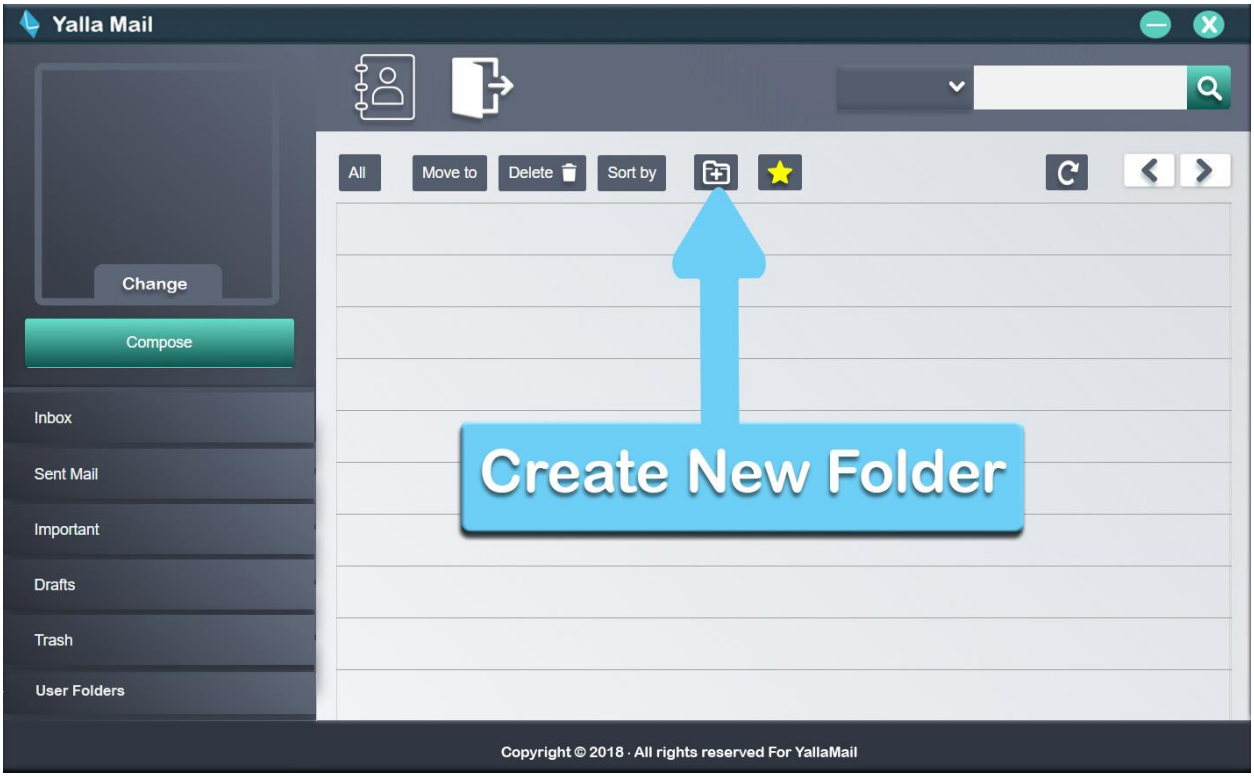
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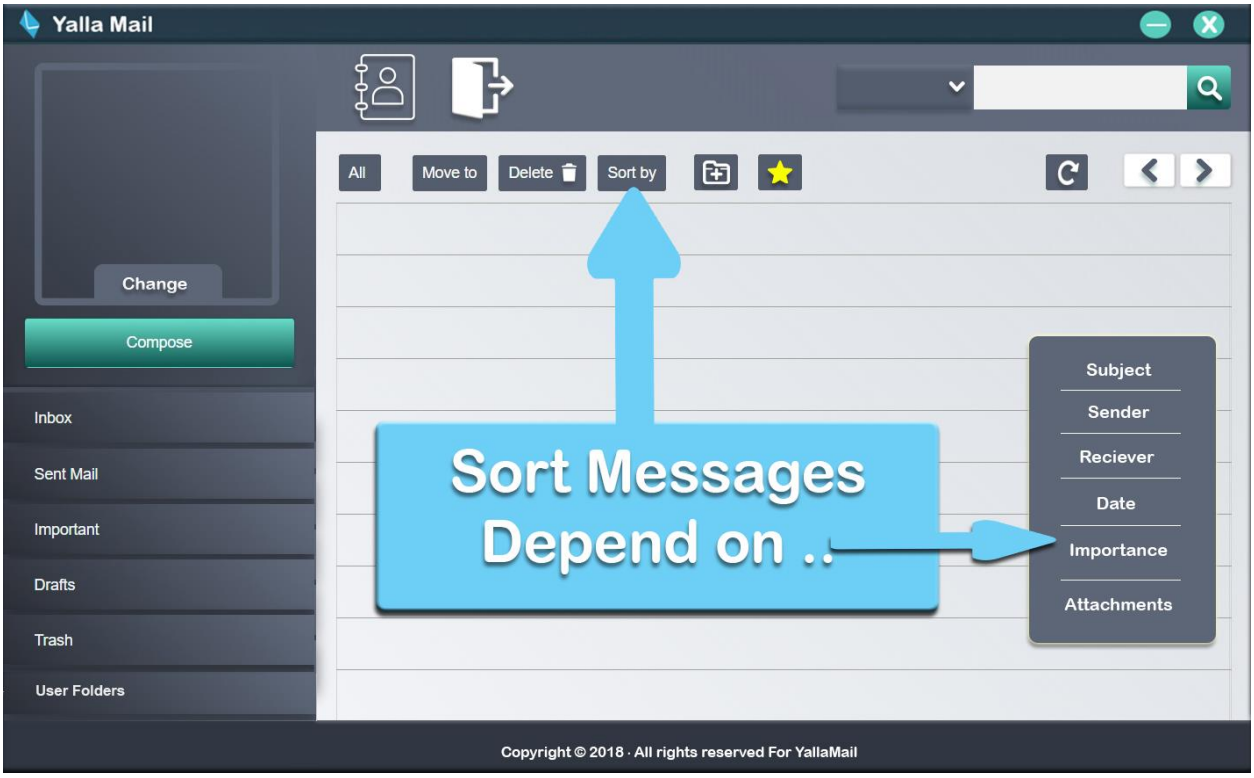
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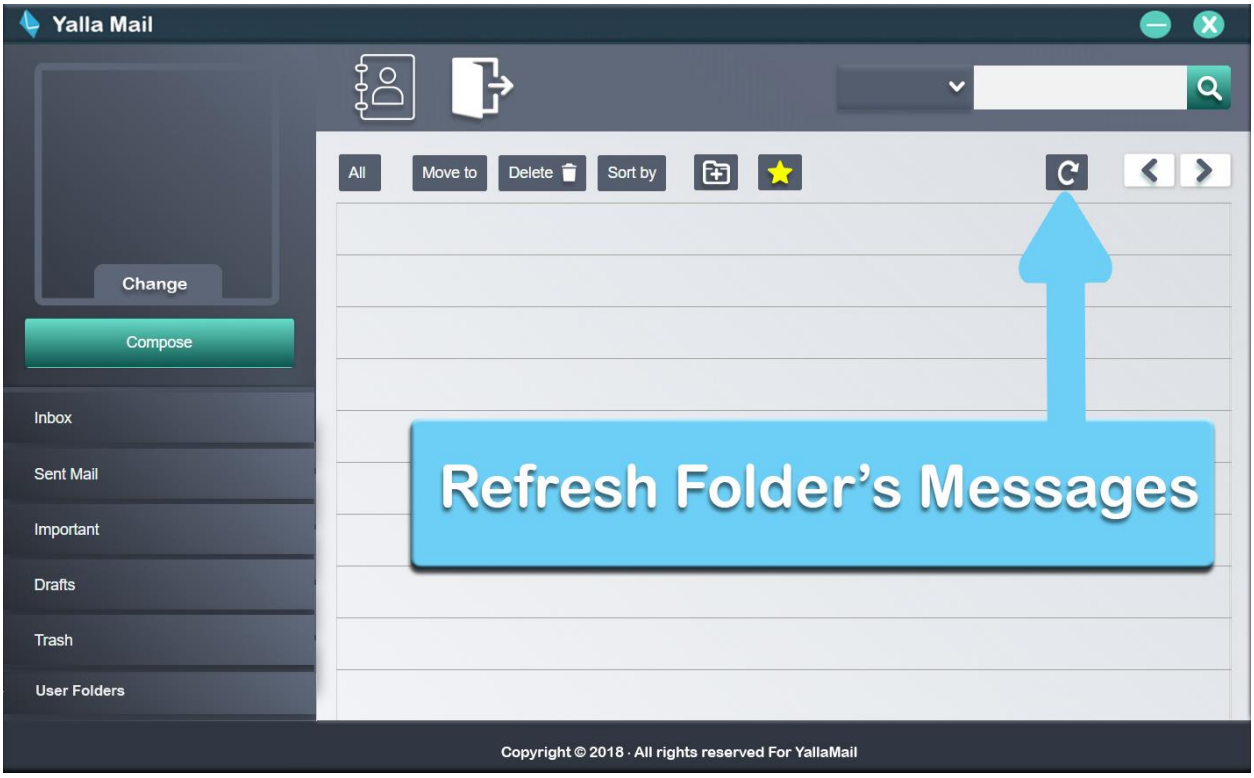
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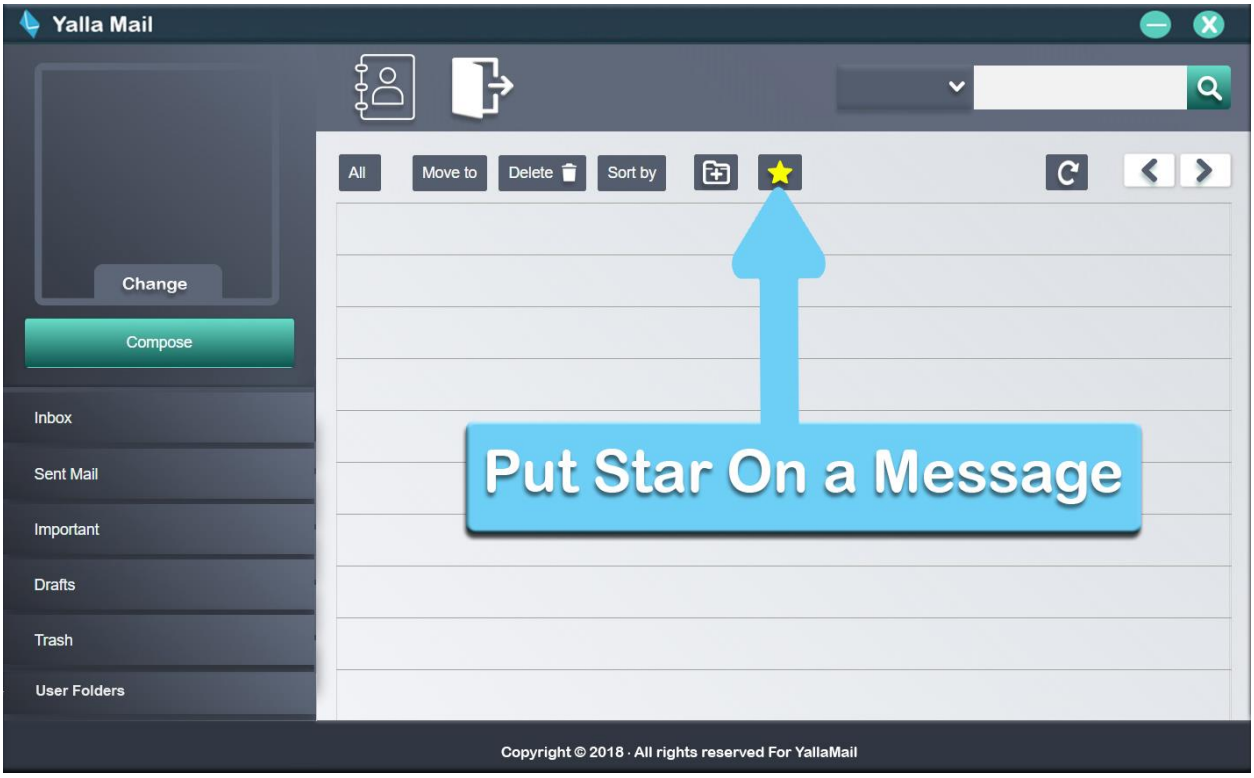
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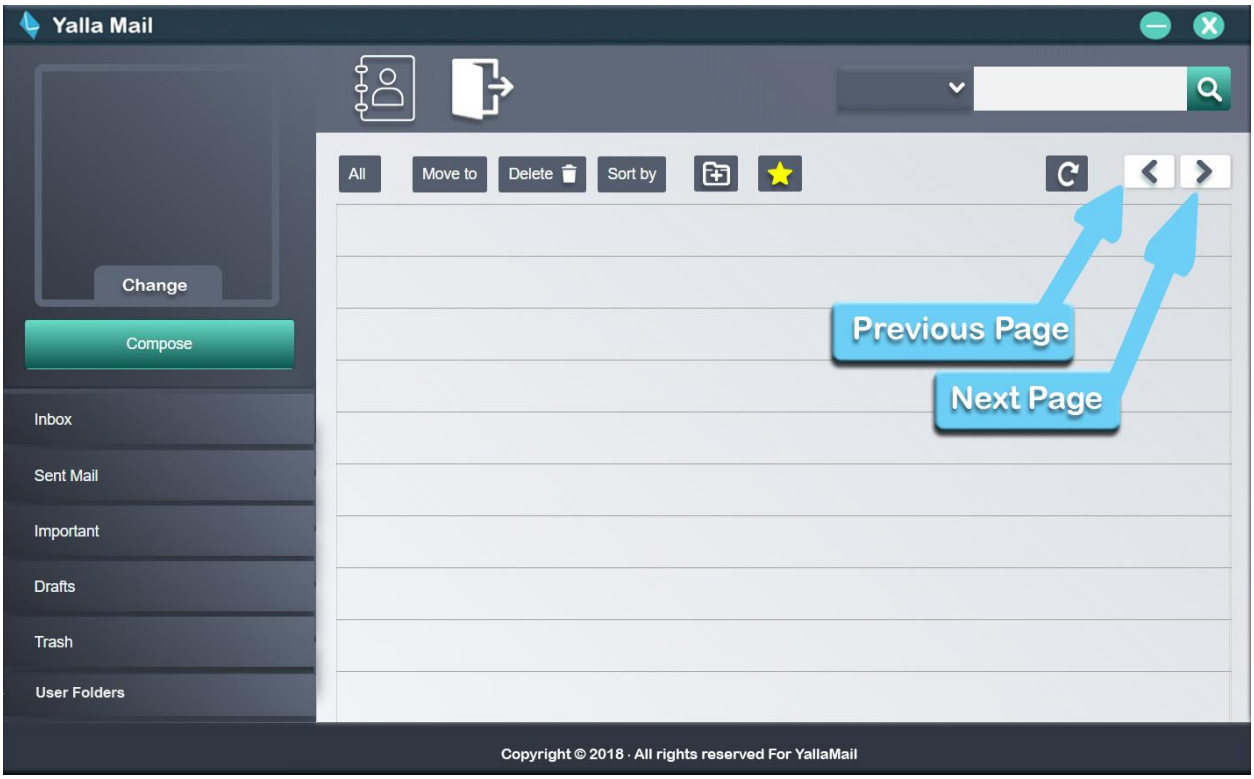
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