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CS 320 - Software Metrics

Creating User Account:

Information Domain Value	Points	Count	Simple	Average	Complex	Total
<i>External Inputs</i>	<ul style="list-style-type: none"> - Provide user information <ul style="list-style-type: none"> - Username - Email - Password - Opt for the user to be emailed for notifications - Enable dark mode - Create user button 	2	4	1	0	5
<i>External Outputs</i>	<ul style="list-style-type: none"> - Error message <ul style="list-style-type: none"> - This email address is associated with another account - Confirmation email - The user was directed to the home page of CodeQuest 	3	1	2	0	3
<i>External Inquiries</i>	<ul style="list-style-type: none"> - Check if the email is already associated with an account 	1	1	0	0	1
<i>Internal Logical Files</i>	<ul style="list-style-type: none"> - The user's profile information is stored in a database table 	1	1	0	0	1
<i>External Interface Files</i>	<ul style="list-style-type: none"> - Authentication via third-party services 	1	0	0	1	1

<i>Total</i>		8	7	3	1	11
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- Internal Logical File (ILF): User-identifiable group of related data maintained within the application.
 - All of the user's information provided in the form is sent to the database.
- External Interface File (EIF): User-identifiable group of related data referenced by the application but maintained within another application.
 - Users choose to sign in through third-party applications such as Google, Discord, or GitHub.
- External Input (EI): Unique elementary process that processes data coming from outside the application boundary.
 - User profile information such as user name, email, password, and enabling notifications via email/dark mode are used as inputs for creating the account.
 - The button is used to confirm and store all information in the database.
- External Output (EO): Unique elementary process that sends data outside the application boundary. Calculations, derivation of data, or maintenance also take place.
 - A confirmation email is sent to the user that an account has been created with CodeQuest.
 - Error message:
 - The user has already created an account with the email provided in the form. Advises users to provide new email as CodeQuest can not make another account with the same email.
 - After the button for creating the account is pressed, the user will be directed to the main page of CodeQuest.
- External Inquiry (EQ): Unique elementary process that sends data outside the application boundary. Calculations, derivation of data, or maintenance do not take place.
 - Check if the email is already associated with an account through a query to the database.

User Authentication:

Information Domain Value	Points	Count	Simple	Average	Complex	Total
<i>External Inputs</i>	- Input fields - Email	4	2	2	3	7

	<ul style="list-style-type: none"> - Password - Third-party OAuth <ul style="list-style-type: none"> - Google - Github - Discord - Password Reset Request - Sign-in button 					
<i>External Outputs</i>	<ul style="list-style-type: none"> - Messages to user <ul style="list-style-type: none"> - Login success message - Login failure message - Password reset - Access token for OAuth 	3	4	2	1	5
<i>External Inquiries</i>	<ul style="list-style-type: none"> - Validate OAuth token 	1	0	0	1	1
<i>Internal Logical Files</i>	<ul style="list-style-type: none"> - User's account information in the database 	1	0	1	1	2
<i>External Interface Files</i>	<ul style="list-style-type: none"> - OAuth with third-party authentication services 	1	0	0	1	1
<i>Total</i>		10	6	5	7	16

- Internal Logical File (ILF): User-identifiable group of related data maintained within the application.
 - Check if the associated email with the password is valid.
- External Interface File (EIF): User-identifiable group of related data referenced by the application but maintained within another application.
 - If a user signs in with third-party authentication through OAuth, CodeQuest redirects for OAuth authentication.
- External Input (EI): Unique elementary process that processes data coming from outside the application boundary.
 - User inputs
 - User's email
 - User's Password
 - Three buttons dedicated to OAuth third-party authentication
 - Google
 - Github
 - Discord

- Sign-button, to initiate external outputs.
- External Output (EO): Unique elementary process that sends data outside the application boundary. Calculations, derivation of data, or maintenance also take place.
 - Messages to users:
 - Login is a success: The user signed in with the correct email and associated password.
 - Login failure:
 - Email is not associated with an account
 - Password Incorrect
 - Verification required for account
 - Password reset:
 - Password reset takes the user to another form for the user to complete.
- External Inquiry (EQ): Unique elementary process that sends data outside the application boundary. Calculations, derivation of data, or maintenance do not take place.
 - Users have to validate the OAuth token with a third-party application if using either Google, Discord, or GitHub.

Viewing Curriculum as a Graph

Information Domain Value	Points	Count	Simple	Average	Complex	Total
<i>External Inputs</i>		0	0	0	0	0
<i>External Outputs</i>	<ul style="list-style-type: none"> - Error Message - User clicked on locked content 	0	1	0	0	4
<i>External Inquiries</i>		0	0	0	0	0
<i>Internal Logical Files</i>	<ul style="list-style-type: none"> - User data - Content data - User Content Progress 	3	2	1	0	24
<i>External Interface Files</i>		0	0	0	0	0

<i>Total</i>		3	2	1	0	28
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Internal Logical File (ILF): check for user data and user content progress to validate starting position in graph, and to validate what content is locked to the user

External Interface File (EIF): There is not external interface file

External Input (EI): There is no external input since there is no action for the user

External Output (EO): an error message is displayed to the user notifying that the content is locked if user clicks on a lesson that has not yet been unlocked.

External Inquiry (EQ): There is no external inquiry since there is no action for the user

Consume Non - Interactive DSA Educational Content (Module 1)

Information Domain Value	Points	Count	Simple	Average	Complex	Total
<i>External Inputs</i>		0	0	0	0	0
<i>External Outputs</i>		0	0	0	0	0
<i>External Inquiries</i>		0	0	0	0	0
<i>Internal Logical Files</i>	<ul style="list-style-type: none"> - User data - User Progress Data 	2	1	1	0	17
<i>External Interface Files</i>	<ul style="list-style-type: none"> - Content Data 	1	1	0	0	5
<i>Total</i>		3	2	1	0	22

Internal Logical File (ILF): check user data and progress data to ensure access to course content

External Interface File (EIF): Load content data for the specific module

External Input (EI): There is no external input since there is no action for the user

External Output (EO): There is no external output since there is no action for the user

External Inquiry (EQ): There is no external inquiry since there is no action for the user

Non-Interactive Multiple Choice Questions pertaining to lesson content (Module 1)

Information Domain Value	Points	Count	Simple	Average	Complex	Total
<i>External Inputs</i>	- Answers to Multiple Choice Questions	1	1	0	0	3
<i>External Outputs</i>	- Result of Multiple Choice Questions (pass or fail)	1	0	1	0	5
<i>External Inquiries</i>	- Updating user's content progress data	1	1	0	0	3
<i>Internal Logical Files</i>	- User data - Content Progress Data	2	1	1	0	17
<i>External Interface Files</i>	- Content Data	1	1	0	0	5
<i>Total</i>		6	4	2	0	33

Internal Logical File (ILF): If the user's answers are checked to be correct

External Interface File (EIF): The content data is loaded in once the user enters the module

External Input (EI): the user inputs answers for each multiple choice question

External Output (EO): the user's answers to the multiple choice questions get checked for correctness, if not all correct the next module stays locked

External Inquiry (EQ): , the content progress data is updated and the user is prompted to the next module if the user's answers are correct

Daily Practice Reminders Through Email

Information Domain Value	Points	Count	Simple	Average	Complex	Total
<i>External Inputs</i>		0	0	0	0	0
<i>External Outputs</i>	- Email notification sent to the user	1	0	1	0	1

<i>External Inquiries</i>	- User profile changes to preferences of email notifications	1	0	1	0	1
<i>Internal Logical Files</i>	- User data name and email from the database	1	1	0	0	1
<i>External Interface Files</i>	- ActionMailer to send notifications to users	1	0	1	0	1
<i>Total</i>		4	1	3	0	4

- Internal Logical File (ILF): User-identifiable group of related data maintained within the application.
 - Take user data from the database to add to the notification email.
 - Take user email from the database to send notifications to.
- External Interface File (EIF): User-identifiable group of related data referenced by the application but maintained within another application.
 - ActionMailer is the Ruby on Rails tool used to send notifications to users via email.
- External Input (EI): Unique elementary process that processes data outside the application boundary.
 - There are no external inputs, as profile settings adjust the option to opt into an email.
- External Output (EO): Unique elementary process that sends data outside the application boundary. Calculations, derivation of data, or maintenance also take place.
 - An email gets sent from CodeQuest to the user.
- External Inquiry (EQ): Unique elementary process that sends data outside the application boundary. Calculations, derivation of data, or maintenance do not take place.
 - The user chooses to adjust whether or not to opt into email through the profile page.

Submit a Solution to an Exercise

- ***External Inputs:***
 - Web Form Submission – MEDIUM
- ***External Outputs:***
 - None.
- ***External Inquiries:***
 - Submit the solution with the corresponding exercise to Judge0 for execution and judging – COMPLEX

- **Internal Logical Files:**
 - Exercises database and ActiveRecord model – MEDIUM
- **External Interface Files:**
 - None
- **Total**
 - 3

Creating a new interactive programming exercise (Module 3)

- **External Inputs:**
 - Web Form Submission – MEDIUM
- **External Outputs:**
 - None.
- **External Inquiries:**
 - Validation through Judge0: Provided test cases pass for the provided solution COMPLEX.
- **Internal Logical Files:**
 - Exercises database table and ActiveRecord model – MEDIUM
- **External Interface Files:**
 - None.
- **Total**
 - 3

Adding a solution in a new language to an existing interactive programming exercise.

- **External Inputs:**
 - Web Form Submission – SIMPLE
- **External Outputs:**
 - Application flash message - SIMPLE
- **External Inquiries:**
 - Submit solution in a new language to Judge0, check the validity of solution - MEDIUM
- **Internal Logical Files:**
 - Exercises database table and ActiveRecord model - SIMPLE
- **External Interface files:**
 - None.
- **Total:**
 - 4

Removing an interactive programming exercise.

- **External Inputs:**
 - Web Form Submission – SIMPLE
 - Some threshold of downvotes has been achieved – MEDIUM

- ***External Outputs:***
 - ActionMailer email to the user who created the content – SIMPLE
- ***External Inquiries:***
 - None.
- ***Internal Logical Files:***
 - Exercises database table and ActiveRecord model – MEDIUM
- ***External Interface files***
 - None.
- ***Total***
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