Create A Perl Script That Will Output All CRNs And Available Seats For A Particular ICS Leeward CC Course

Create A Perl Script That Will Output All CRNs And Available Seats For A Particular ICS Leeward CC Course is a valuable task for students, administrators, and educators who need to efficiently access real-time course enrollment information. Automating the process with a Perl script not only saves time but also reduces manual errors, ensuring that users always have the latest data on course availability. Whether you're managing multiple courses or just looking for a quick way to retrieve enrollment statuses, developing a Perl script tailored for ICS courses at Leeward Community College can be a game-changer.

In this comprehensive guide, we'll walk through the process of creating a robust Perl script that fetches all Course Reference Numbers (CRNs) and available seats for a specific ICS course at Leeward CC. We'll cover the essentials of understanding the data source, scripting techniques, and best practices to ensure your script functions reliably and efficiently.

Understanding the Data Source for ICS Course Information

Before diving into scripting, it’s crucial to understand where and how the course data is stored or accessible. Leeward CC, like many institutions, offers online portals that display course schedules, enrollment numbers, and CRNs. These portals often provide data via:

- Web pages (HTML content)
- APIs (Application Programming Interfaces)
- Data files (CSV, XML, JSON)

Key considerations include:

- Access method: Does Leeward CC provide an official API? If so, using it simplifies data retrieval.
- Web scraping: If no API exists, scraping the course listing pages may be necessary.
- Data format: Understanding whether data is in HTML, JSON, or another format helps determine parsing strategies.

For most college course registration systems, data is presented on web pages, making web scraping a common approach.

Prerequisites for Creating the Perl Script

To develop an effective Perl script for this task, you'll need:

- Perl installed on your system (version 5.10+ recommended)
- CPAN modules such as:
- `LWP::UserAgent` for HTTP requests
- `HTML::TreeBuilder` or `HTML::TableExtract` for parsing HTML
- `JSON` if dealing with JSON data
- Basic knowledge of Perl syntax and web data structures

Optional tools for development:

- Text editors like VSCode, Perl IDEs
- Debugging tools such as `Perl::Critic`

Step-by-Step Guide to Create the Perl Script

Creating a Perl script to extract CRNs and available seats involves several key steps:

1. Identifying the Correct Web Page or API Endpoint

- Visit the Leeward CC course registration portal.
- Search for the specific ICS course.
- Use your browser’s developer tools (F12) to inspect network requests and determine where data is fetched from.

2. Fetching Web Page Content

Utilize `LWP::UserAgent` to retrieve the page content:

```perl
use LWP::UserAgent;

my $ua = LWP::UserAgent->new();
my $url = 'https://www.leeward.edu/ICS_Course_Page'; Replace with actual URL
my $response = $ua->get($url);

if ($response->is_success) {
my $html_content = $response->decoded_content;
Proceed to parse HTML
} else {
die "Failed to retrieve page: " . $response->status_line;
}
```

3. Parsing HTML Content to Extract CRNs and Available Seats

Use `HTML::TableExtract` to locate relevant tables:

```perl
use HTML::TableExtract;

my $te = HTML::TableExtract->new( headers => [ 'CRN', 'Seats Available' ] );
$te->parse($html_content);

foreach my $ts ($te->tables) {
foreach my $row ($ts->rows) {
my ($crn, $seats_available) = @$row;
print "CRN: $crn, Available Seats: $seats_available\n";
}
}
```

If the data isn't in a table, alternative parsing strategies like regex or `HTML::TreeBuilder` may be necessary.

4. Filtering for the Specific Course

- Use the course number or name as a filter.
- Loop through all extracted rows, check for matching course info, then display CRN and seats.

5. Handling Multiple CRNs

Since a single course may have multiple CRNs (different sections), ensure your script outputs all relevant CRNs with their corresponding available seats.

Complete Example Perl Script

Below is a simplified, complete example illustrating the key steps. Replace URL and parsing details with actual data from Leeward CC’s course pages.

```perl
!/usr/bin/perl
use strict;
use warnings;
use LWP::UserAgent;
use HTML::TableExtract;

Define the course code to search for, e.g., 'ICS 101'
my $target_course_code = 'ICS 101';

URL of the course listing page
```

```
my $url = 'https://www.leeward.edu/ICS_Course_Page'; Replace with actual URL

Initialize web agent
my $ua = LWP::UserAgent->new();

Fetch page content
my $response = $ua->get($url);
die "Failed to retrieve page: " . $response->status_line unless $response->is_success;

my $html_content = $response->decoded_content;

Parse HTML to find course data
my $te = HTML::TableExtract->new( headers => [ 'CRN', 'Course', 'Seats Available' ] );
$te->parse($html_content);

Iterate through tables and find relevant CRNs
my @matching_crns;
foreach my $ts ($te->tables) {
foreach my $row ($ts->rows) {
Assuming columns: CRN, Course, Seats Available
my ($crn, $course, $seats) = @$row;
if (defined $course && $course =~ /\b\Q$target_course_code\E\b/i) {
push @matching_crns, { crn => $crn, seats => $seats };
}
}
}

Output results
if (@matching_crns) {
print "CRNs and Available Seats for $target_course_code:\n";
foreach my $entry (@matching_crns) {
print "CRN: $entry->{crn} - Available Seats: $entry->{seats}\n";
}
} else {
print "No CRNs found for course $target_course_code.\n";
}
```

Best Practices for Developing Your Perl Script

Developing a reliable script involves adhering to best practices:

1. Error Handling

- Always check the success of HTTP requests.
- Validate parsed data before processing.
- Handle missing or malformed data gracefully.

2. Modular Coding

- Break the script into functions, such as `fetch_page()`, `parse_html()`, `filter_courses()`.
- Improves readability and maintainability.

3. Regular Updates

- Course data and web page structures may change; regularly review your script.
- Use version control (e.g., Git) to track changes.

4. Respect Web Server Resources

- Avoid excessive requests; add delays if scraping multiple pages.
- Comply with the website's terms of service.

Extending the Script Functionality

Once your basic script is functional, consider adding features:

- Command-line arguments to specify course codes dynamically.
- Output to CSV or JSON for integration with other tools.
- Scheduling with cron jobs to automate daily updates.
- Graphical interface for easier interaction.

Conclusion

Creating a Perl script to output all CRNs and available seats for a particular ICS course at Leeward Community College streamlines enrollment management and academic planning. By understanding the data source, leveraging Perl modules like `LWP::UserAgent` and `HTML::TableExtract`, and following best coding practices, you can develop a reliable tool tailored to your needs. This automation not only saves time but also provides accurate, real-time information, empowering students and staff to make informed decisions about course registration.

Remember: Always verify the current structure of the college's course pages or APIs, as web data formats can change, requiring updates to your script. With patience and attention to detail, your Perl-based solution will become an essential resource for managing ICS course enrollment at Leeward CC.

Keywords: Perl script, CRN extraction, available seats, ICS courses, Leeward Community College, web scraping, HTML parsing, automation, course enrollment, scripting tutorial

Frequently Asked Questions

How can I fetch CRNs and available seats for a specific ICS course at Leeward CC using Perl?

You can write a Perl script that performs HTTP requests to the Leeward CC registration system or API, parses the returned data (HTML or JSON), and extracts the CRNs and available seat information for the specified course code. Modules like LWP::UserAgent and HTML::TreeBuilder can be helpful.

What are the key steps to create a Perl script for listing all CRNs and seats for an ICS course at Leeward CC?

Key steps include: 1) Identify the course registration URL or API endpoint for Leeward CC. 2) Send an HTTP request with appropriate parameters for the specific ICS course. 3) Parse the response to extract CRNs and seat availability. 4) Output the data in a readable format.

Are there existing Perl modules or APIs to facilitate retrieving course seat information at Leeward CC?

Leeward CC may not offer a public API; however, you can use web scraping modules like LWP::UserAgent and HTML::TreeBuilder to extract course data from the registration website. Always check the site's terms of service before scraping.

How do I ensure my Perl script accurately captures all CRNs and available seats for a course at Leeward CC?

Ensure your script correctly targets the latest registration page, handles pagination if present, and parses the HTML or JSON responses carefully. Testing with multiple course sections and verifying output against the website will improve accuracy.

Can I automate the process of updating CRN and seat information for ICS courses using Perl?

Yes, by scheduling your Perl script with a scheduler like cron, you can automate periodic retrieval and updating of CRN and seat data, enabling real-time or scheduled monitoring of course availability at Leeward CC.

Additional Resources

Create A Perl Script That Will Output All CRNs And Available Seats For A Particular ICS Leeward CC Course is an engaging and practical project for students, educators, and administrators seeking to automate the retrieval of course registration data. By scripting in Perl, a language renowned for its text processing capabilities and ease of scripting, you can efficiently extract real-time information about course availability, specifically focusing on CRNs (Course Reference Numbers) and the number of available seats. This article provides a comprehensive guide to designing, developing, and

deploying such a script, along with an in-depth analysis of its features, challenges, and best practices.

Understanding the Context and Importance of the Script

Before diving into coding, it’s crucial to grasp why creating a Perl script for this purpose is valuable. At Leeward Community College (Leeward CC), students often need quick access to enrollment data for courses like ICS (Information and Computer Science). Manually checking course availability via the college website or registration portal can be time-consuming and error-prone. Automating this process with a Perl script offers several advantages:

- Efficiency: Rapidly fetch data for multiple courses without manual effort.
- Accuracy: Minimize human errors associated with manual data collection.
- Convenience: Obtain real-time data with minimal interaction.
- Automation: Schedule periodic checks or integrate with other tools for advanced workflows.

Understanding these benefits underscores the value of scripting such a utility.

Prerequisites and Preparation

Before starting, ensure you have the following:

- Basic knowledge of Perl programming: Familiarity with syntax, modules, and command-line execution.
- Access to course data source: Typically, Leeward CC provides course information via a web portal, which might be accessible through HTTP requests.
- Perl environment setup: Installed Perl interpreter (e.g., Strawberry Perl for Windows or default Perl on Linux/Mac).
- Modules: Install necessary Perl modules like `LWP::UserAgent` for web requests and `HTML::TreeBuilder` or `HTML::Parser` for parsing HTML content.

It’s also advisable to review the college’s policies regarding data scraping or automated access to ensure compliance.

Understanding the Data Source and Its Structure

The core of this project involves retrieving course data from Leeward CC's online systems. Typically, course information is hosted on a registration or course listing website, which may have:

- Static HTML pages
- Dynamic pages generated via server-side scripts
- APIs providing JSON or XML data

Key considerations:

- Identify how course data is presented: Is there a search form? How are CRNs and seat counts displayed?
- Determine the URL structure: Is there a specific URL pattern for course searches?
- Check for authentication requirements: Are login credentials necessary? If so, handling sessions and cookies becomes essential.

Once this is understood, you can plan how to extract the relevant information.

Designing the Perl Script

The script's main goal is to input a course identifier (e.g., course code, section) and output all associated CRNs along with available seats. The general flow involves:

1. Input Parameters: Accept the course code or other identifiers from the user.
2. Web Request: Send an HTTP request to the course search page with appropriate parameters.
3. Parsing Response: Extract CRNs and seat availability from the returned HTML or data.
4. Output: Display the list of CRNs with their respective available seats in a readable format.

Let's break down each component.

Input Handling

Use command-line arguments or prompts to input the course code:

```perl
my $course_code = shift @ARGV or die "Usage: perl course_check.pl \n";
```

Alternatively, prompt the user:

```perl
print "Enter the course code (e.g., ICS 111): ";
my $course_code = ;
chomp($course_code);
```

Making a Web Request

Leverage `LWP::UserAgent` for HTTP requests:

```perl
use LWP::UserAgent;

my $ua = LWP::UserAgent->new;
my $url = 'https://leeward.hawaii.edu/registration/search'; Placeholder URL
my %params = (
'searchterm' => $course_code,
Additional parameters may be needed
);

my $response = $ua->post($url, \%params);

unless ($response->is_success) {
die "Failed to retrieve data: " . $response->status_line;
}
my $content = $response->decoded_content;
```

Note: Replace `$url` and parameters with actual values from the college’s system.

Parsing HTML Content

Use modules like `HTML::TreeBuilder` to parse the returned HTML:

```perl
use HTML::TreeBuilder;

my $tree = HTML::TreeBuilder->new_from_content($content);

Find the table or section containing course info
my @tables = $tree->look_down(_tag => 'table', class => 'courseTable'); Example class

foreach my $table (@tables) {
Parse rows and columns
my @rows = $table->look_down(_tag => 'tr');
foreach my $row (@rows) {
my @cells = $row->look_down(_tag => 'td');
Extract CRN and seats from specific columns
Implementation depends on actual HTML structure
}
}
$tree->delete; Cleanup
```

```

Adjust selectors based on actual HTML structure.

---

# Extracting and Displaying Data

After parsing, store CRNs and seat data in data structures (hashes or arrays):

```perl
my @courses;
foreach my $row (@rows) {
my @cells = $row->look_down(_tag => 'td');
next unless @cells >= 3; Assuming three columns: CRN, Section, Seats
my $crn = $cells[0]->as_text;
my $available_seats = $cells[2]->as_text;
push @courses, { crn => $crn, seats => $available_seats };
}
```

Finally, output the data:

```perl
print "CRN\tAvailable Seats\n";
foreach my $course (@courses) {
print "$course->{crn}\t$course->{seats}\n";
}
```

Handling Dynamic Content and Authentication

Some college portals use JavaScript-generated content or require login sessions.

- JavaScript Content: Perl alone cannot execute JavaScript. In such cases, consider tools like Selenium with Perl bindings or headless browsers such as PhantomJS.
- Authentication: Use `LWP::UserAgent` to manage cookies and sessions:

```perl
Log in
my $login_response = $ua->post($login_url, \%login_params);
Check login success, then proceed
```
```

Pros:
- Automates complex pages
- Maintains session state

Cons:
- Increased complexity
- Requires additional modules or external tools

Advantages and Limitations of the Perl Approach

Pros:

- Powerful text and HTML parsing: Perl excels at pattern matching and HTML processing.
- Extensive module ecosystem: Modules like `LWP`, `HTML::TreeBuilder`, and `JSON` simplify web interactions.
- Customizability: Scripts can be tailored precisely to specific data sources.

Cons:

- Fragile to website changes: HTML structure updates can break parsing logic.
- Limited support for modern web features: Dynamic content generated via JavaScript can be challenging.
- Learning curve: Requires familiarity with Perl modules and web scraping techniques.

Best Practices and Tips

- Always respect the website’s robots.txt and terms of service.
- Add error handling: Manage network errors, unexpected HTML structures, or missing data.
- Implement logging: Record script actions for debugging.
- Schedule regular checks: Use cron jobs for automated periodic updates.
- Secure sensitive data: If login credentials are involved, handle them securely.

Potential Enhancements

- Graphical User Interface (GUI): Build a simple interface with Perl/Tk.
- Email notifications: Alert users when seats become available.
- Database integration: Store historical data for trend analysis.
- Cross-platform compatibility: Ensure the script runs on various OSes.

Conclusion

Creating a Perl script to output all CRNs and available seats for a specific ICS course at Leeward CC is a highly practical project that combines web scraping, data parsing, and scripting skills. While the task involves understanding the college's data presentation and handling potential complexities like dynamic content or authentication, the benefits of automation—speed, accuracy, and convenience—are significant. By following best practices, leveraging Perl's powerful modules, and designing with flexibility in mind, users can develop a robust tool to streamline course registration monitoring. This project not only enhances technical skills but also provides a valuable resource for students and staff seeking real-time enrollment data, ultimately contributing to more efficient academic planning and management.

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