CA 2

E-Commerce

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Nov 14, 2024

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Exercise 1

a)

New Entities

- **SUPPLIER**: This entity would store information about the new product suppliers.
  - Attributes: `supplier_id` (primary key), `supplier_name`, `contact_person`, `email`, `phone`, `address`.
    - Data manipulation operations:
      - `add_supplier`: Inserts a new supplier into the SUPPLIER table.
      - `modify_supplier`: Updates supplier information in the SUPPLIER table.
      - `delist_supplier`: Logically removes a supplier from the SUPPLIER table.
- **PREMIUM_CUSTOMER**: This entity represents customers who have signed up for the premium program. It would be a specialized entity inheriting from the CUSTOMER entity.
  - Attributes: `customer_id` (primary key, foreign key referencing CUSTOMER), `points_balance`.
    - Data manipulation operations:
      - `register_premium_customer`: Creates a new PREMIUM_CUSTOMER record when a customer enrolls in the premium program. This operation should also add the customer to the CUSTOMER table if they are not already registered.
      - `update_points`: Updates the `points_balance` for a PREMIUM_CUSTOMER after a purchase.
      - `redeem_points`: Allows a PREMIUM_CUSTOMER to redeem points for discounts or other rewards.
      - `cancel_premium_customer`: Removes a customer from the PREMIUM_CUSTOMER table when they cancel their premium membership.
- **PROMOTION**: This entity stores information about the various promotions being offered.
  - Attributes: `promotion_id` (primary key), `promotion_name`, `start_date`, `end_date`, `description`.
    - Data manipulation operations:
      - `add_promotion`: Adds a new promotion to the PROMOTION table.
      - `modify_promotion`: Updates the details of an existing promotion.
      - `remove_promotion`: Deletes a promotion from the PROMOTION table.

New Relationships

- **SUPPLIES**: This relationship connects the SUPPLIER entity to the PRODUCT entity. It represents which suppliers provide which products. This relationship is M-N because a supplier can supply multiple products, and a product can be supplied by multiple suppliers.

  - Attributes: None.
    - Data manipulation operations: No specific operations are required, as this relationship is managed by the operations that add and remove products from the catalogue.

- **INCLUDED_IN**: This relationship connects the PRODUCT entity to the PROMOTION entity. This relationship is M-N because a product can be part of multiple promotions, and a promotion can include multiple products.
  - Attributes: `quantity` (the number of units of the product required to qualify for the promotion), `free_product_id` (foreign key referencing PRODUCT, if applicable). This attribute would store the ID of the product offered for free in a "buy X, get Y free" promotion.
    - Data manipulation operations:
      - `add_product_to_promotion`: Adds a product to a promotion.
      - `remove_product_from_promotion`: Removes a product from a promotion.

Modifications to Existing Operations

- `list_product`: This operation would need to be modified to include the `supplier_id` as an input parameter. This ensures that newly added products are associated with their corresponding supplier.
- `calculate_order_total`: This operation needs modification to factor in discounts offered to PREMIUM_CUSTOMERs and promotional discounts based on the `INCLUDED_IN` relationship.

New Operations

- `apply_promotion`: This operation would be executed during the checkout process to check if any promotions apply to the customer's order and adjust the order total accordingly.

These modifications enhance the existing conceptual model by allowing for:

- **Supplier management**: The addition of the SUPPLIER entity allows the toy company to manage its supplier network efficiently.
- **Promotion creation and management**: The toy company can define various types of promotions and associate them with specific products.
- **Premium customer management**: The toy company can track PREMIUM_CUSTOMERs and their points balance, enabling personalized offers and rewards.

> **Note**
>
> The data manipulation operations associated with each new entity and relationship ensure data integrity and consistency. The modifications to existing operations and the creation of new operations support the new functionalities and integrate them seamlessly with the existing system.

b)

The image positions technology and marketing as integral components of gamification. When applied to an online store's promotion system, both elements play critical roles in implementation.

Technology underpins the entire gamified promotion system. **Screaming Frog SEO Spider** is a software tool that can analyze various aspects of a website, including page titles, meta descriptions, and internal linking. It helps identify technical SEO issues and provides data that can be used for optimization. These technical capabilities are essential for implementing gamified elements like point tracking, leaderboards, and achievement badges. A robust database, as discussed in our previous conversation and exemplified in source, is crucial for storing and managing the data generated by customer interactions within the gamified system.

Marketing leverages technology to create engaging and effective promotional campaigns. Marketing strategies in e-commerce rely heavily on data analysis and customer relationship management (CRM). A data warehouse, described in source, serves as a repository of historical data from various sources, including the operational database, which can be used for analyzing customer behavior and preferences. This data empowers marketing teams to design gamified promotions tailored to specific customer segments, driving engagement and encouraging desired actions. For example, Screaming Frog SEO Spider can be used to track the performance of different landing pages and identify areas for improvement, which can inform the design of gamified elements within those pages.

Exercise 2

a)

SEO (Search Engine Optimization) is the practice of optimizing a website to improve its visibility in organic search engine results, while **SEM** (Search Engine Marketing) is a broader term that encompasses both SEO and paid search advertising strategies, such as Pay-Per-Click (PPC) campaigns. Here are some differences among the two found on the internet:

- **Cost**: SEO is generally cost-effective over time, focusing on organic strategies, while SEM involves ongoing costs for paid advertising.
- **Speed**: SEO takes time to show results, often months, whereas SEM can provide immediate visibility through paid ads.
- **Sustainability**: SEO offers long-term, sustainable traffic growth, while SEM traffic stops when ad spending ceases.
- **Components**: SEO focuses on optimizing for organic search results, while SEM includes both SEO and paid search strategies like PPC.
- **Goal**: SEO aims to improve organic rankings, while SEM seeks to increase visibility through both organic and paid methods.

- SEO vs SEM: Key Differences
- What's The Difference Between SEO and SEM?

b)

Link Building

Link building is crucial for establishing authority and trustworthiness. In e-commerce, acquiring high-quality backlinks from reputable sites signals to search engines that your site is credible. Techniques include guest blogging, influencer partnerships, and creating shareable content. Quality over quantity is essential, as links from authoritative sites carry more weight and can significantly boost search rankings.

Social Media Engagement

Active social media presence enhances brand visibility and drives traffic to your e-commerce site. Sharing engaging content, interacting with followers, and leveraging platforms like Instagram and Pinterest can increase brand awareness and generate backlinks. While social signals aren't direct ranking factors, they contribute to overall online presence and can indirectly influence SEO by driving traffic and engagement.

Online Reviews and Reputation Management

Positive reviews and a strong online reputation build trust with potential customers and search engines. Encourage satisfied customers to leave reviews on platforms like Google My Business and Yelp. Responding to reviews, both positive and negative, shows engagement and can improve customer perception. A strong reputation can lead to increased click-through rates and conversions, positively impacting search rankings.

- Understanding On-Page and Off-Page E-commerce SEO
- What Is Off-Page SEO?

c)

I have run *Screaming Frog* on the site uoc.edu, as seen on these images:

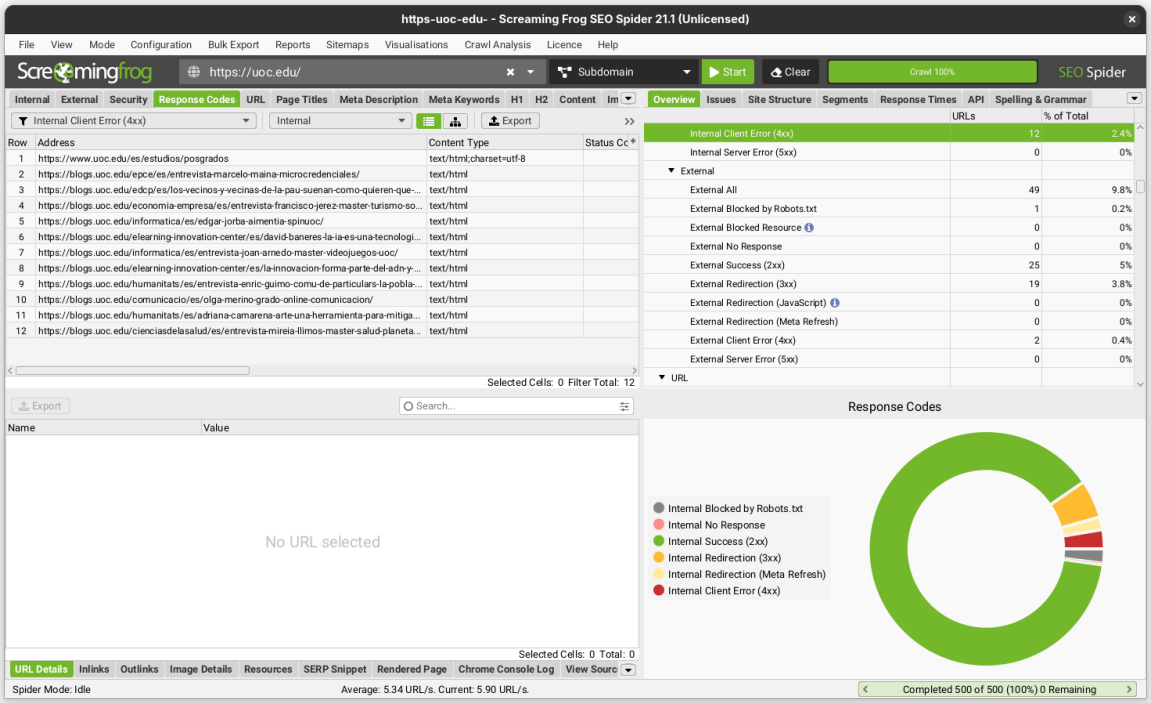

Figure 1: Test results

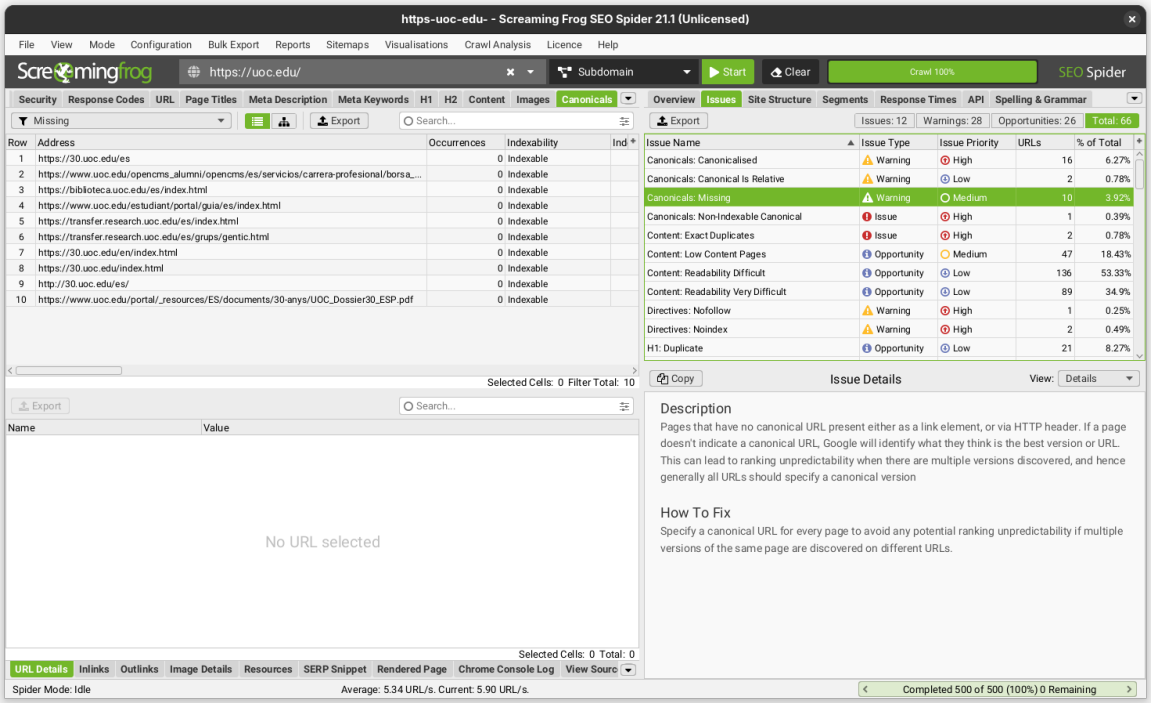

Figure 2: Test errors and warnings

Here are the three issues found and my proposed solutions to each of them:

1. **Non-Indexable Canonical:**
   - **Description:** This issue occurs when a page has a canonical URL that is non-indexable, meaning it might be blocked by `robots.txt`, have no response, or return errors. This can confuse search engines and lead to indexing issues.
   - **Fix:** Ensure that canonical URLs point to indexable pages by checking for any blocks in `robots.txt`, resolving any server errors, and ensuring the canonical page is not set to "noindex."
2. **Missing Canonicals:**
   - **Description:** Pages without a canonical URL can lead to ranking unpredictability, as search engines may not know which version of a page to prioritize.
   - **Fix:** Specify a canonical URL for each page to guide search engines in identifying the preferred version, especially when multiple versions of a page exist.
3. **Exact Duplicates:**
   - **Description:** Identical pages can split PageRank signals and cause unpredictability in search rankings. This happens when multiple URLs serve the same content.
   - **Fix:** Implement a single canonical version for each set of duplicate pages and use 301 redirects

to point other versions to this canonical URL, ensuring internal links also point to the canonical version.