

# Introduction

This report will analyze the Courts and Harvey Norman websites as they utilize similar design languages due to their core business being in the e-commerce industry, but vary in their modernity as the Courts website features a more current user interface.

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# Analysis

## A. Quality & Standards

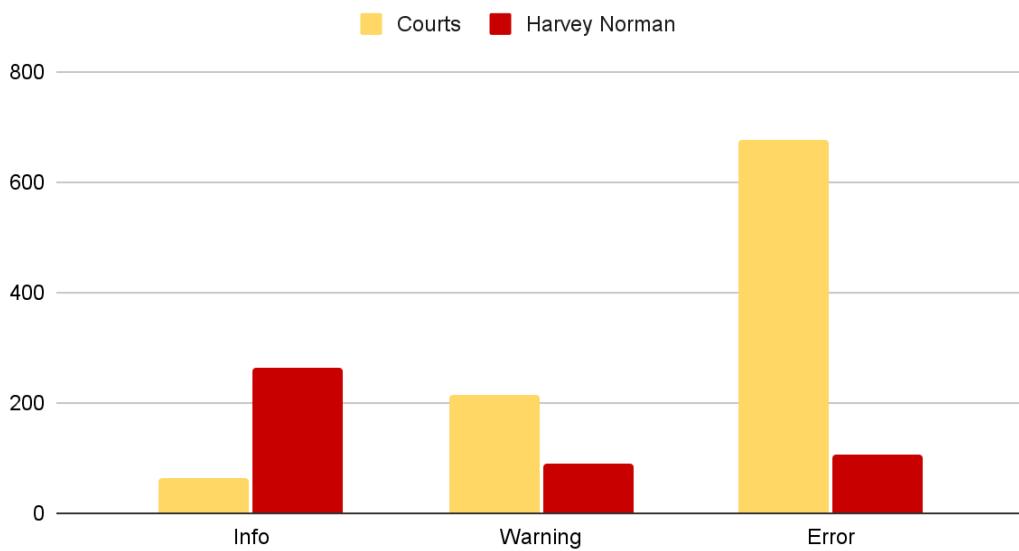
Utilizing the Markup Validation Service provided by W3C at <https://validator.w3.org/>, we are able to analyze the adherence to HTML5 standards displayed by the Courts and Harvey Norman website.

<https://validator.w3.org/nu/?showsource=yes&showimagereport=yes&doc=https%3A%2F%2Fwww.courts.com.sg%2F>

<https://validator.w3.org/nu/?showsource=yes&showimagereport=yes&doc=https%3A%2F%2Fwww.harveynorman.com.sg%2F>

The validator found that the Courts website had 955 issues (216 warnings, 63 info, 676 errors), while the Harvey Norman website had 458 issues (89 warnings, 263 info, 106 errors)

HTML5 Standard Adherence



Based on the results, the following analysis could be made about the quality of the websites, with regards to bugs, errors and broken links.

### Harvey Norman Website

The Harvey Norman website adheres more closely to HTML5 standards and generally displays higher quality and standard of code. It contained a higher number of informational messages, which are relatively less significant than other types and typically has no effect on the accessibility of the website.

## Informational

### 1. Trailing slash on void elements has no effect and interacts badly with unquoted attribute values.

Occurrences: 253

- 8. **Info** Trailing slash on void elements [has no effect and interacts badly with unquoted attribute values](#).  
From line 14, column 2; to line 14, column 223  
`height">... <meta name="description" content="Shop online. Fast delivery or free store pick up. Buy`
- 9. **Info** Trailing slash on void elements [has no effect and interacts badly with unquoted attribute values](#).  
From line 15, column 9; to line 15, column 43  
`>... <meta name="mode" content="full" />... <`

The HTML code uses trailing slashes at the end of void elements, or self-closing tags, which is a bad practice as it interferes with any elements that may have unquoted attributes.

## Warning

### 1. The type attribute is unnecessary for JavaScript resources.

Occurrences: 82

- 8. **Warning** The `type` attribute is unnecessary for JavaScript resources.  
From line 39, column 2; to line 39, column 158  
`EAD --><!--> <script type="text/javascript" src="https://s3-ap-southeast-1.amazonaws.com/hnsgsfp/4/statics/js/tygh/scripts-5bf67cdcaa72c1a3f5438d4e9da679fdf.js?ver=4.0.1"></script>`
- 9. **Warning** The `type` attribute is unnecessary for JavaScript resources.  
From line 39, column 168; to line 39, column 339  
`></script><script type="text/javascript" src="https://s3-ap-southeast-1.amazonaws.com/hnsgsfp/4/statics/js/tygh/deferred-scripts-310610fa684a5b7ff448889ab454368f.js?ver=4.0.1" defer></script>`

This warning indicates that the type attribute was specified on a script tag importing a javascript file, which is not necessary, as script tags are implicitly javascript.

### 2. Attribute with the local name \_\_ is not serializable as XML 1.0.

Occurrences: 2

- 4. **Warning** Attribute with the local name `[xmlns:fb]` is not serializable as XML 1.0.  
From line 6, column 23; to line 6, column 151  
`E 9]><!--> <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xmlns:og="http://ogp.me/ns#" xmlns:fb="https://www.facebook.com/2008/fbml"> <!--<`

The attributes passed into the tags have been deprecated and should be updated to the new syntax.

### 3. Consider avoiding viewport values that prevent users from resizing documents.

Occurrences: 1

- 5. **Warning** Consider avoiding viewport values that prevent users from resizing documents.  
From line 13, column 2; to line 13, column 112  
`rome=1">... <meta name="viewport" content="width=device-width, minimum-scale=1.0, maximum-scale=1.0, height=device-height">...`

The **minimum-scale** and **maximum-scale** attributes limit the zooming on the web page. When set to the same values, they essentially disable scaling or zooming. This can make it difficult for users with impaired or low vision to use the website.

#### 4. Section lacks heading. Consider using h2-h6 elements to add identifying headings to all sections, or else use a div element instead for any cases where no heading is needed.

Occurrences: 2

15. **Warning** Section lacks heading. Consider using `h2-h6` elements to [add identifying headings](#).  
 From line 3440, column 3; to line 3440, column 46  
`straps"><!--<section class="carousel-sect-d intro-fade"><--<`

The **section** element defines sections of a document that should contain headings to present each section. If not intended, a **div** element should be used instead.

#### 5. The first occurrence of ID \_\_ was here.

Occurrences: 1

18. **Error** Duplicate ID `straps`.  
 From line 3746, column 1; to line 3746, column 17  
`</style><!--<div id="straps"><--<s`
19. **Warning** The first occurrence of ID `straps` was here.  
 From line 3438, column 1; to line 3438, column 17  
`</style><!--<div id="straps"><--<s`

The warning indicates the first occurrence of an ID assigned to an element, which is paired with an error that states that an element with a duplicate ID was found. This is bad practice as it leads to potentially unexpected behaviour with Javascript and future browser compatibility.

Error

#### 1. Attribute \_\_ not allowed here.

Occurrences: 2

1. **Error** Attribute `xmlns:og` not allowed here.  
 From line 6, column 23; to line 6, column 151  
`E 9]><!--<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xmlns:og="http://ogp.me/ns#" xmlns:fb="https://www.facebook.com/2008/fbml"><!--<`
2. **Error** Attribute `xmlns:fb` not allowed here.  
 From line 6, column 23; to line 6, column 151  
`E 9]><!--<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xmlns:og="http://ogp.me/ns#" xmlns:fb="https://www.facebook.com/2008/fbml"><!--<`

The Open Graph Protocol attributes are not valid HTML5 and should be specified in meta tags instead. View the Open Graph Protocol website for more information: <https://ogp.me>.

## 2. A charset attribute on a meta element found after the first 1024 bytes.

Occurrences: 1

1. **Error** A `charset` attribute on a `meta` element found after the first 1024 bytes.

At line 11, column 25

`charset="utf-8"><-- <meta ht`

The charset attribute in the meta tag should be at the beginning of the document, within the first 1024 bytes.

```

1. <!DOCTYPE html>^
2. <!--[if lt IE 7]> <html class="lt-ie9 lt-ie8 lt-ie7" xmlns="http://www.w3.org/1999/xhtml" lang="en" xmlns:og="http://ogp.me/ns#" xmlns:fb="https://www.facebook.com/2008/fbml"> <![endif]-->
3. <!--[if IE 7]> <html class="lt-ie9 lt-ie8" xmlns="http://www.w3.org/1999/xhtml" lang="en" xmlns:og="http://ogp.me/ns#" xmlns:fb="https://www.facebook.com/2008/fbml"> <![endif]-->
4. <!--[if IE 8]> <html class="lt-ie9" xmlns="http://www.w3.org/1999/xhtml" lang="en" xmlns:og="http://ogp.me/ns#" xmlns:fb="https://www.facebook.com/2008/fbml"> <![endif]-->
5. <!--[if IE 9]> <html class="ie9" xmlns="http://www.w3.org/1999/xhtml" lang="en" xmlns:og="http://ogp.me/ns#" xmlns:fb="https://www.facebook.com/2008/fbml"> <![endif]-->
6. <!--[if gt IE 9]>--> <html xmlns="http://www.w3.org/1999/xhtml" lang="en" xmlns:og="http://ogp.me/ns#" xmlns:fb="https://www.facebook.com/2008/fbml"> <!---[endif]-->
7. <head>^
8.   <title>Home | Harvey Norman Singapore</title>
9.
10. <base href="https://www.harveynorman.com.sg/" />
11. <meta charset="utf-8">^
12. <meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1">^
13.   <meta name="viewport" content="width=device-width, minimum-scale=1.0, maximum-scale=1.0, height=device-height">^
14.   <meta name="description" content="Shop online. Fast delivery or free store pick up. Buy Electronics, TV&#039;s, Appliances, Computers, Smartphones, Cameras, Furniture, Beds, and more. available" />^
15.   <meta name="mode" content="full" />
```

This error occurs on the Harvey Norman website due to its IE-compatible comments that only Internet Explorer can parse as HTML.

## 3. A meta element with an http-equiv attribute whose value is X-UA-Compatible must have a content attribute with the value IE=edge.

Occurrences: 1

2. **Error** A `meta` element with an `http-equiv` attribute whose value is `X-UA-Compatible` must have a `content` attribute with the value `IE=edge`.

From line 12, column 5 to line 12, column 66

`f-8">^ <meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1"><met`

The “`chrome=1`” value for the content attribute with the above configurations is not supported.

## 4. An element with role=menuitem must be contained in, or owned by, an element with role=menubar or role=menu.

Occurrences: 1

3. **Error** An element with `role=menuitem` must be contained in, or owned by, an element with `role=menubar` or `role=menu`.

From line 860, column 9 to line 860, column 28

`>^ <li role="menuitem">`

The `li` element with the `menuitem` role is not a child of an element with the `menubar` or `menu` role attribute.

## 5. Element br not allowed as child of element ul in this context.

Occurrences: 1

1. **Error** Element `br` not allowed as child of element `ul` in this context.

From line 1043, column 67; to line 1043, column 70

`<br>`

Contexts in which element `br` may be used:

Where [phrasing content](#) is expected.

Content model for element `ul`:

Zero or more `li` and [script-supporting](#) elements.

The `br` element may only be used where phrasing content is expected, such as `p` elements, but not `ul` elements.

## 6. Element style not allowed as child of element \_\_ in this context.

Occurrences: 2

2. **Error** Element `style` not allowed as child of element `form` in this context.

From line 2852, column 3; to line 2852, column 9

`/>  
      
    style>ul#att`

Contexts in which element `style` may be used:

Where [metadata content](#) is expected.

In a `noscript` element that is a child of a `head` element.

Content model for element `form`:

[Flow content](#), but with no `form` element descendants.

1. **Error** Element `style` not allowed as child of element `div` in this context.

From line 3306, column 13; to line 3306, column 19

`<style>`>`html`

Contexts in which element `style` may be used:

Where [metadata content](#) is expected.

In a `noscript` element that is a child of a `head` element.

Content model for element `div`:

If the element is a child of a `dl` element: one or more `dt` elements followed by one or more

If the element is not a child of a `dl` element: [flow content](#).

The `style` element may only be used where metadata content is expected, such as the `head` element, but not `form` or `div` elements.

## 7. Element li not allowed as child of element div in this context.

Occurrences: 1

76. **Error** Element `li` not allowed as child of element `div` in this context.

From line 11438, column 4; to line 11453, column 69

`none">  
    li  class="clearfix ###_stock_status###_store-id-###_store_i  
store-phone="###_store_phone###"  data-store-stock-availability=  
icon="###_icon_stock_detail###"  data-stock-message="###_stock_m`

Contexts in which element `li` may be used:

Inside `ol` elements.

Inside `ul` elements.

Inside `menu` elements.

Content model for element `div`:

If the element is a child of a `dl` element: one or more `dt` elements followed by one or m

If the element is not a child of a `dl` element: [flow content](#).

The `li` element may only be used within list type elements such as `ol`, `ul` and `menu`, but not `div` elements.

## 8. An img element must have an alt attribute, except under certain conditions

Occurrences: 20

1. **Error** An `img` element must have an `alt` attribute, except under certain conditions. For details, consult [guidance or](#)  
From line 3444, column 92; to line 3444, column 185  
`rab.html"></a>`
2. **Error** An `img` element must have an `alt` attribute, except under certain conditions. For details, consult [guidance or](#)  
From line 3447, column 105; to line 3447, column 202  
`ion.html"></a>`

This error indicates that images in the website are missing the `alt` attribute, which provides screen readers with a description, and viewers with an alternative text for the image.

## 9. Bad value 100% for attribute width on element img: Expected a digit but saw % instead.

Occurrences: 4

1. **Error** Bad value `100%` for attribute `width` on element `img`: Expected a digit but saw `%` instead.  
From line 3844, column 2; to line 3844, column 121  
`ie zoom"></div>`

The `width` attribute of an `img` tag expects a number, and does not support percentage values as CSS does.

## 10. Stray end tag small.

Occurrences: 12

1. **Error** Stray end tag `small`.  
From line 3965, column 213; to line 3965, column 220  
`rcase">was</small> </spa`

A closing `small` element tag was rendered but does not match any opening `small` tag.

## 11. = in an unquoted attribute value. Probable causes: Attributes running together or a URL query string in an unquoted attribute value.

Occurrences: 28

1. **Error** `=` in an unquoted attribute value. Probable causes: Attributes running together or a URL query string in an unquoted attribute value.  
At line 4046, column 118  
`SW5jaCByXBoB3A=`

```

<a data-product-id=80660>
  data-product-code=2044666<
  data-product-name=QXN1cyBaZW5ib29rIFVNMsQwM11BLUTONzIyVyBSNyAxNkdCIFJBTSArIDFUQiBTU0QgMTQtSW5jaCBMYXB0b3A=<
  data-product-brand=Asus<
  data-product-category=Q29tchV0ZXJzLCBUYWJsZXRzICYgR2FtaW5n<
  data-product-quantity=34<
  data-product-price=1715<
  data-product-index=0<
  data-product-list-id=434<
  data-product-list-name=QmVzdCBTZWxsZXJzIFByb2R1Y3Rz<
  data-product-discount=0<
  data-product-department=20<

```

The website uses Base64 encoded values. An error was thrown as an attribute value was unquoted and the value contained an “=”. This is invalid syntax as the “=” character is reserved for attribute assignments.

## 12. Bad value col-md-12 col-sd-12 for attribute id on element div: An ID must not contain whitespace.

Occurrences: 1

1. **Error** Bad value [col-md-12 col-sd-12] for attribute [id] on element [div]: An ID must not contain whitespace.  
From line 11391, column 9, to line 11391, column 38  
>└─ <div id="col-md-12 col-sd-12">

The **div** element is assigned an id that contains whitespace. The id assigned seems to be bootstrap classes and are likely wrongly assigned as an id instead of classes.

## 13. Bad value button for attribute type on element a: Subtype missing.

Occurrences: 2

2. **Error** Bad value [button] for attribute [type] on element [a]: Subtype missing.  
From line 11404, column 9, to line 11404, column 80  
>└─ <a class="btn btn-a" id="buy\_from\_store\_action\_btn\_close" type="button">\_affil

The **type** attribute on an **a** element hints the MIME type of the linked resource, such as “application/pdf” for PDF documents. It does not specify the type of the **a** element which in this case, the developer tried to assign the type of a button.

## 14. Element a is missing required attribute href.

Occurrences: 1

1. **Error** Element [a] is missing required attribute [href].  
From line 11404, column 9, to line 11404, column 80  
>└─ <a class="btn btn-a" id="buy\_from\_store\_action\_btn\_close" type="button">\_affil  
Attributes for element a:  
[Global attributes](#)

An **a** element is missing the href attribute which is typically required. This could be faulty usage of the **a** element as it seems that the developer is using it as a button with an on-click listener to provide interactivity.

#### 14. No space between attributes.

Occurrences: 6

1. **Error** **No space between attributes.**

At line 11407, column 612

`put type="text" name="Suburb" id`

There should be spaces between attributes in element tags.

#### 15. No space between attributes.

Occurrences: 1

1. **Error** **Bad character [#] after [<]. Probable cause: Unescaped [<]. Try escaping it as [&lt;].**

At line 11424, column 79

`sm hidden-xs"><##_selected_st`

# characters were used after a < character which is reserved for opening tags and is invalid syntax. However, the tag was not closed.

```
<div class="col-sm-6 location-title visible-md visible-sm hidden-xs">###_selected_store_name_###</div>~
</div><!--end-col12-->~
<div class="row v-divider col-sm-12 no-padding stock-avail-box clear">~
  <div class="col-sm-6 no-padding stock-results">~
    <!-- LOCATION-DETAILS -->~
    <ul class="no-padding stock-results-list">###_stock_results_list_###</ul>~
  </div>~
  <!-- START SUMMARY -->~
  <div class="col-sm-6 stock-summary"></div>~
  <!-- END SUMMARY -->~
</div>~
```

Therefore the < character could have just been an unescaped character that was meant to be rendered as text.

#### 16. Text not allowed in element ul in this context.

Occurrences: 1

1. **Error** **Text not allowed in element ul in this context.**

From line 11429, column 55; to line 11429, column 80

`lts-list">###_stock_results_list_###</ul>~`

Content model for element ul:

Zero or more li and script-supporting elements.

Text was written in the **ul** element which is not supported. Only list elements are allowed.

**17. Bad value //www.google.com/maps/place/###\_store\_lat\_###,###\_store\_lng\_### for attribute href on element a: Illegal character in fragment: # is not allowed.**

Occurrences: 1

```
1. Error Bad value //www.google.com/maps/place/###_store_lat_###,###_store_lng_### for attribute href on element a: Illegal character in fragment: # is not allowed.
From line 11531, column 21 to line 11531, column 137
<a href="//www.google.com/maps/place/###_store_lat_###,###_store_lng_###" target="_blank" class="btn btn-google-map">Open M
```

There are multiple # characters in the fragment of the href value of a link which is not allowed. This is likely because the developer uses ### as delimiters which Javascript is supposed to replace with the actual values.

**18. The align attribute on the img element is obsolete. Use CSS instead.**

Occurrences: 1

```
1. Error The align attribute on the img element is obsolete. Use CSS instead.
From line 11693, column 9 to line 11693, column 199

```

The **align** attribute for images is deprecated. CSS should be applied and the attribute **float** should be used instead.

**19. End tag li seen, but there were open elements.**

Occurrences: 1

```
<li>
  <input type='radio' id="travelByDriving" name='travelModeOption' value='DRIVING' checked />
  <label for="travelByDriving">DRIVING</li>
```

A closing **li** tag is rendered before its child elements are closed.

**20. Unclosed element label.**

Occurrences: 1

```
2. Error Unclosed element label.
From line 11802, column 8 to line 11802, column 36
</label for="travelByDriving">DRIVIN
```

The label element was unclosed, also causing error 20 above.

**21. No li element in scope but a li end tag seen.**

Occurrences: 1

```
1. Error No li element in scope but a li end tag seen.
From line 11810, column 7 to line 11810, column 11
</li>
```

```

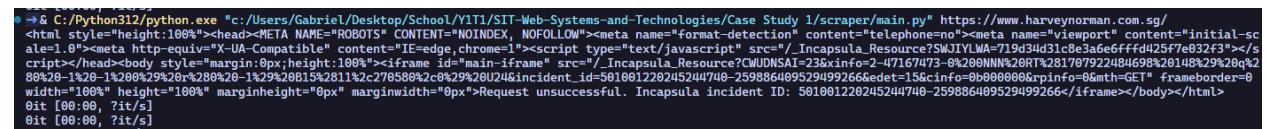
<ul style="list-style-type: none; padding-left: 0; margin: 0; font-family: inherit; font-size: inherit; color: inherit; border: none; border-collapse: collapse; font-weight: bold; font-style: italic; text-decoration: none; background-color: inherit; position: relative; z-index: 1; position: absolute; left: 0; top: 0; width: 100%; height: 100%;>
    <li>
        <input type='radio' id="travelByDriving" name='travelModeOption' value='DRIVING' checked="checked" /><label for="travelByDriving">DRIVING</li>
    <li>
        <input type='radio' id="travelByBicycling" name='travelModeOption' value='BICYCLING' /><label for="travelByBicycling">BICYCLING</li>
    <li>
        <input type='radio' id="travelByWalking" name='travelModeOption' value='WALKING' />
        <label for="travelByWalking">WALKING</li>
    </li>
</ul>

```

An extra closing *li* tag can be seen, and does not match any opening *li* tag.

## Invalid Links

Attempting to use a custom programmed web scraping tool, my requests were blocked by **Incapsula**, a Web Application Firewall (WAF) provider.



```

C:\Python312\python.exe "c:/Users/Gabriel/Desktop/School/Y1T1/SIT-Web-Systems-and-Technologies/Case Study 1/scraping/main.py" https://www.harveynorman.com.sg/
<html style="height:100%"><head><meta NAME="ROBOTS" CONTENT="NOTINDEX, NOFOLLOW"><meta name="format-detection" content="telephone=no"><meta name="viewport" content="initial-scale=1.0"><meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1"><script type="text/javascript" src="/_Incapsula_Resource?SWJTYLWA=719d34d31c8e3a6e6ffffd425f7e032f3"></script></head><body style="margin:0px; height:100%"><iframe id="main_iframe" src="/_Incapsula_Resource?CWIDNSAI=23&info=2-07167473-09200NNN%20RT&281707922481698%20148%20q%208020-1%20-1%20082%20%280815%2811%2c270580%2c0%29%28024&incident_id=501001220245244740-259886409529499266&edet=15&info=0b000000&rinfo=0&mth=GET" frameborder="0" width="100%" height="100%" marginheight="0px" marginwidth="0px">Request unsuccessful. Incapsula incident ID: 501001220245244740-259886409529499266</iframe></body></html>

```

Therefore it was impossible to automate finding any broken links.

## Courts Website

The Courts Website contains a large number of errors and warnings which reflect the quality of the code and adherence to HTML5 standards and poor accessibility.

## Informational

**1. Trailing slash on void elements has no effect and interacts badly with unquoted attribute values.**

Occurrences: 54

39.	<b>Info</b> Trailing slash on void elements <a href="#">has no effect</a> and <a href="#">interacts badly with unquoted attribute values</a> .
	From line 2825, column 3; to line 2825, column 49
	= "Y" /> <input type="hidden" name="status" value="A" />
40.	<b>Info</b> Trailing slash on void elements <a href="#">has no effect</a> and <a href="#">interacts badly with unquoted attribute values</a> .
	From line 2826, column 3; to line 2826, column 49
	= "A" /> <input type="hidden" name="pshort" value="N" />

The HTML code uses trailing slashes at the end of void elements, or self-closing tags, which is a bad practice as it interferes with any elements that may have unquoted attributes.

## Warning

### 1. The type attribute is unnecessary for JavaScript resources.

Occurrences: 120

1. **Warning** The `type` attribute is unnecessary for JavaScript resources.

From line 4, column 9; to line 4, column 39

```
>...      <script type="text/javascript">...<
```

This warning indicates that the type attribute was specified on a script tag importing a javascript file, which is not necessary, as script tags are implicitly javascript.

### 2. Consider avoiding viewport values that prevent users from resizing documents.

Occurrences: 1

9. **Warning** Consider avoiding viewport values that prevent users from resizing documents.

From line 166, column 9; to line 166, column 114

```
>...      <meta name="viewport" content="width=device-width, initial-scale=1, maximum-scale=1.0, user-scalable=no"/>... <
```

The `user-scalable=no` attribute disables zooming on a web page, which can make it difficult for users with impaired or low vision to use the website.

### 3. The navigation role is unnecessary for element nav.

Occurrences: 1

12. **Warning** The `navigation` role is unnecessary for element `nav`.

From line 401, column 17; to line 401, column 123

```
<nav itemscope itemtype="http://www.schema.org/SiteNavigationElement" class="navigation" role="navigation">...<
```

The `role="navigation"` attribute is unnecessary as the `nav` element is shorter and uses correct semantic HTML. It is only valid when assigned to a `div` element.

### 4. Attribute https: is not serializable as XML 1.0.

Occurrences: 1

200. **Warning** Attribute `https:` is not serializable as XML 1.0.

From line 929, column 128; to line 929, column 852

```
nest-hub">
```

An img tag contains invalid attributes due to the random placement of image URLs in the tag. This can be seen in the HTML code which shows multiple URLs chained together without an attribute name.

5. The type attribute for the style element is not needed and should be omitted.

Occurrences: 2

230. **Warning** The `type` attribute for the `style` element is not needed and should be omitted.  
From line 1879, column 1; to line 1879, column 23  
`anner -->←<style type="text/css">← .`

The style tag includes a type attribute which is not required as the tag implicitly specifies CSS stylings.

6. The first occurrence of ID [id] was here.

Occurrences: 105

246. **Error** Duplicate ID `old-price-514592-widget-product-grid`.  
From line 2191, column 9 to line 2191, column 130  
> `<span id="old-price-514592-widget-product-grid" data-price-amount="889" data-price-type="oldPrice" class="price-wrapper"><span`

247. **Warning** The first occurrence of ID `old-price-514592-widget-product-grid` was here.  
From line 2183, column 9 to line 2183, column 132  
> `<span id="old-price-514592-widget-product-grid" data-price-amount="829" data-price-type="finalPrice" class="price-wrapper"><span`

The warning indicates the first occurrence of an ID assigned to an element, which is paired with an error that states that an element with a duplicate ID was found. This is bad practice as it leads to potentially unexpected behaviour with Javascript and future browser compatibility.

## Error

**1. Attribute \_\_ not allowed on element \_\_ at this point.**

Occurrences: 223

Attribute [ ] not allowed on element [ ] at this point. (223) · [Hide all](#) · [Show all](#)

- 1.1  Attribute `defer` not allowed on element `link` at this point. (8)
- 1.2  Attribute `autocomplete` not allowed on element `input` at this point.
- 1.3  Attribute `width` not allowed on element `button` at this point.
- 1.4  Attribute `height` not allowed on element `button` at this point.
- 1.5  Attribute `https:` not allowed on element `img` at this point.
- 1.6  Attribute `www.courts.com.sg` not allowed on element `img` at this point.
- 1.7  Attribute `media` not allowed on element `img` at this point.
- 1.8  Attribute `staging.courts.com.sg` not allowed on element `img` at this point.
- 1.9  Attribute `max-width` not allowed on element `img` at this point. (104)
- 1.10  Attribute `max-height` not allowed on element `img` at this point. (104)

In general, this error is caused by using non-standard attributes, non-supported styling attributes or invalid attribute names.

73. **Error** Attribute `autocomplete` not allowed on element `input` at this point.  
 From line 323, column 17; to line 333, column 25

```
<input id="search" type="text" name="q" class="input-text algolia-search-input" autocomplete="off" spellcheck="false" />
```

Attributes for element `input`:  
[Global attributes](#)

The error above is thrown as the `autocomplete` attribute is non-standard and only supported by Safari.

## 2. An img element must have an alt attribute, except under certain conditions.

Occurrences: 86

100. **Error** An `img` element must have an `alt` attribute, except under certain conditions. For details, consult [guidance on providing text alternatives for images](#).  
 From line 610, column 17; to line 610, column 97

```
<h3>Featur
```

This error indicates that images in the website are missing the `alt` attribute, which provides screen readers with a description, and viewers with an alternative text for the image.

**3. Bad value \_\_ for attribute \_\_ on element \_\_: Illegal character in query: \_\_ is not allowed.**Occurrences: 86

Bad value [ ] for attribute [ ] on element [ ]. Illegal character in query [ ] is not allowed. (6) · Hide all · Show all

3.1  Bad value [ /home-appliances/large-appliances/built-in-ovens-cookers?type1[0]=Cooker%20Hobs&type1[1]=Cooke ] for attribute [ href ] on element [ a ]. Illegal character in query [ ] is not allowed.

3.2  Bad value [ https://www.courts.com.sg/tv-entertainment/vision/television?screen\_size1[0]=55%22%20to%2060%22&screen\_size1[1]=61%22%20to%2065%22 ] for attribute [ href ] on element [ a ]. Illegal character in query [ ] is not allowed.

3.3  Bad value [ https://www.courts.com.sg/tv-entertainment?type1[0]=Digital%20Antenna&type1[1]=HDMI%20Cables&type1[2]=Micro%20HIFI&type1[3]=TV%20Brackets&type1[4]=Others ] for attribute [ href ] on element [ a ]. Illegal character in query [ ] is not allowed.

3.4  Bad value [ /computing-mobile/printers/all-printers?type1[0]=Laser%20Printers&type1[1]=Inkjet%20Printers ] for attribute [ href ] on element [ a ]. Illegal character in query [ ] is not allowed.

3.5  Bad value [ /computing-mobile/technology-accessories/all-tech-accessories?type1[0]=Mobile%20Accessories&type1[1]=Mobile%20Tablet%20Accessories ] for attribute [ href ] on element [ a ]. Illegal character in query [ ] is not allowed. (2)

The error states that the values assigned to attributes on specific elements are formatted wrongly and are invalid. In the case of the Courts website, its URLs use square brackets, which by the validator's standards are invalid for the href attributes in links.

**4. Element \_\_ not allowed as child of element \_\_ in this context.**Occurrences: 130

1. **Error** Element [ style ] not allowed as child of element [ div ] in this context. (Suppressing further errors from this subtree.)

From line 523, column 1 to line 523, column 7

```
[li>-</ul>->style>->.ves-
```

Contexts in which element **style** may be used:

- Where **metadata content** is expected.
- In a **noscript** element that is a child of a **head** element.

Content model for element **div**:

- If the element is a child of a **di** element: one or more **dt** elements followed by one or more **dd** elements, optionally intermixed with **script-supporting elements**.
- If the element is not a child of a **di** element: **flow content**.

The error indicates that **style** tags were used as children of the **div** and **a** element tags, which does not conform to HTML5 standards that state that **style** tags may only appear in the **head** element.

**5. End tag br.**Occurrences: 2

1. **Error** End tag [ br ].

From line 589, column 71 to line 589, column 75

```
NES &amp;lt;/br&gt;EARPHO
```

The error occurs as the **br** tag is self closing and does not require a trailing slash. In this case, it specifies a closing **br** tag which is invalid as there are no **br** opening tags.

**6. A slash was not immediately followed by >.**Occurrences: 68

1. **Error** A slash was not immediately followed by [>].

At line 929, column 155

```
= "lazy" https://www.courts.com
```

This error indicates that a slash character was used without closing a tag, which is invalid syntax. This occurs due to the Courts website's unusual practice of placing URLs directly into some *img* tags without attribute names.

## 7. A slash was not immediately followed by >.

Occurrences: 47

Duplicate attribute [ ] (47) · [Hide all](#) · [Show all](#)

- 7.1  Duplicate attribute [https:] (16)
- 7.2  Duplicate attribute [media] (16)
- 7.3  Duplicate attribute [staging.courts.com.sg] (7)
- 7.4  Duplicate attribute [www.courts.com.sg] (8)

1. **Error** Duplicate attribute [https:]

At line 929, column 186

```
[sg/media/https://staging.court]
```

2. **Error** Duplicate attribute [media]

At line 929, column 215

```
[ts.com.sg/media/https://staging]
```

This error states that duplicate attributes were defined in the same opening element tags. It is also due to the unusual passing of image URLs into img tags without attribute names, causing issues with the HTML parsing.

## 8. CSS: Parse Error.

Occurrences: 5

1. **Error** CSS: Parse Error.

From line 1920, column 51; to line 1921, column 4

```
r:#e8335e} ↵ .home-
```

2. **Error** CSS: Parse Error.

From line 1929, column 51; to line 1930, column 4

```
r:#fef200} ↵ .home-
```

The style definitions in the Courts website's *style* tags are missing semicolons which define the end of each style attribute and value.

## 9. Bad value auto for attribute loading on element img.

Occurrences: 2

1. **Error** Bad value `auto` for attribute `loading` on element `img`.

From line 1955, column 109; to line 1955, column 187

```
[ight.jpg"></sour]
```

The `loading` attribute on `img` tags only supports the values eager and lazy, not `auto`.

## 10. Stray end tag source.

Occurrences: 2

1. **Error** Stray end tag `source`.

From line 1955, column 188; to line 1955, column 196

```
[ng="auto"></source></pict]
```

Closing `source` tags were written but there were no opening `source` tags to match it.

## 11. Bad value for attribute target on element a: Browsing context name must be at least one character long.

Occurrences: 35

2. **Error** Bad value  for attribute `target` on element `a`: Browsing context name must be at least one character long.

From line 3460, column 2216; to line 3460, column 2334

```
[e: none;"><a href="https://www.courts.com.sg/dyson/all-products" target="" data-link-type="default" title="" data-element="link"><img c]
```

The `target` attribute on `link` elements is empty, which are invalid values.

## 12. No p element in scope but a p end tag seen.

Occurrences: 2

1. **Error** No `p` element in scope but a `p` end tag seen.

From line 3459, column 1; to line 3459, column 4

```
[iv></div>←</p></div>
```

A closing `p` tag was used without a matching opening tag. This error also occurs if block elements are created in inline elements.

## 13. Too many messages

Occurrences: 1

2. **Fatal Error Too many messages.**

<https://www.courts.com.sg/>

This error does not provide any information and could be due to breaking elements or syntax in the website's code.

### Invalid Links

Using a custom programmed web scraping tool, I discovered some broken links on the main page as shown below:

- <https://www.courts.com.sg/fujifilm>
- <https://www.courts.com.sg/brands>

The URL <https://www.courts.com.sg/fujifilm> can be seen in the sidebar of the **Smart Tech & Phones** section of the dropdown menu.

The screenshot shows the top navigation bar of the Courts.com.sg website. The menu items include APPLIANCES, TV & HOME, COMPUTER, TABLETS &, SMART TECH &, FURNITURE, KIDS, SERVICES, BRANDS, HOT DEALS, THEATRE, GAMING, and PHONES. Below the menu, there are several product categories with sub-links:

- PHONES**: Apple iPhones, Samsung Galaxy Phones, Android Phones, Home Phones, [Shop All Smart Phones >](#)
- WEARABLES**: Apple Watch, Samsung Watch, Germin Smart Watch, [Shop All >](#)
- ACCESSORIES**: Power Banks, Camera Accessories, Mobile Accessories, [Shop All >](#)
- HEADPHONES & EARPHONES**: On-Ear Headphones, In-Ear Headphones, Over-Ear Headphones, Earbuds, Wireless Headphones, [Shop All >](#)
- SMART HOME**: Digital Door Lock, Smart Home Monitoring, Smart Lighting & Plugs, Digital Safe, [Shop All >](#)
- CAMERAS**: Action Cameras, Instant Photo Cameras, [Shop All >](#)
- FEATURED BRANDS**: Authorised Reseller, Canon, FUJIFILM, GARMIN, Google, HUAWEI, Lenovo, LG

However, it leads to an empty page that returns a 404 error.

The screenshot shows the top navigation bar of the Courts website. It includes a search bar, delivery tracking, store locator, sign in, and a cart icon. Below the main menu, there are secondary categories: APPLIANCES, TV & HOME, COMPUTER, TABLETS &, SMART TECH &, FURNITURE, KIDS, SERVICES, BRANDS, HOT DEALS, THEATRE, GAMING, and PHONES. A red arrow points to the 'BRANDS' button.

The **Brands** button of the dropdown menu leads to <https://www.courts.com.sg/brands>

The screenshot shows the 'BRAND SPOTLIGHT' page. It features a large banner with the text 'BRAND SPOTLIGHT' and 'Find unbeatable deals from featured brands weekly!' followed by logos for FUTUR, hoppie, and TCL. A red arrow points to the 'Shop Now' button at the bottom right of the banner.

Which also returns a blank page and a 404 error.

The screenshot shows the homepage of Courts.com.sg. At the top, there is a navigation bar with icons for back, forward, search, and user account. The URL 'courts.com.sg/brands' is displayed. Below the navigation bar is the Courts logo and a search bar with placeholder text 'Search for products'. To the right of the search bar are icons for 'Track Your Delivery', 'Store Locator', 'Sign In', and a shopping cart containing '(0)'. The main menu features categories such as APPLIANCES, TV & HOME, COMPUTER, TABLETS &, SMART TECH &, FURNITURE, KIDS, SERVICES, BRANDS, THEATRE, GAMING, and PHONES. A red 'HOT DEALS' banner is visible on the right side of the menu. At the bottom of the header, there are three promotional banners: 'Product Protection Plans for up to 6 Years!', 'Serving Singapore for 49 Years', and 'Lowest Price Guaranteed'.

## B. Accessibility

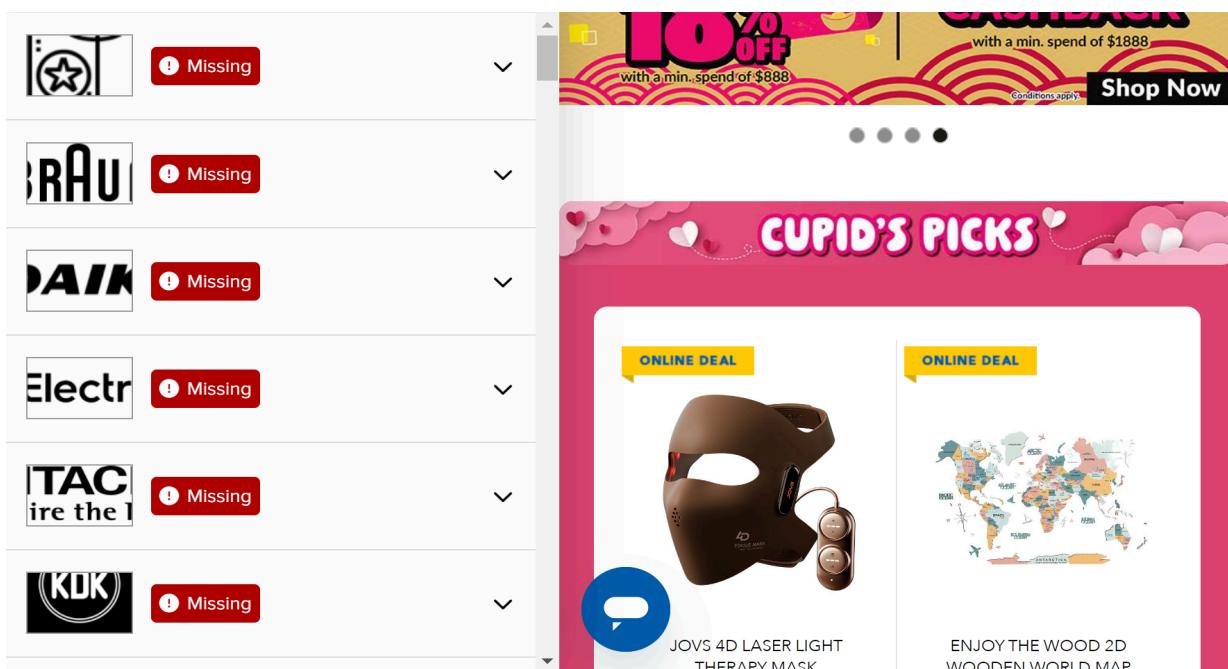
To assess the accessibility of the websites, several accessibility assessment tools were utilized, such as the following:

- ## - Silktide Accessibility Checker

These tools check the accessibility of websites in accordance with multiple versions of WCAG standards

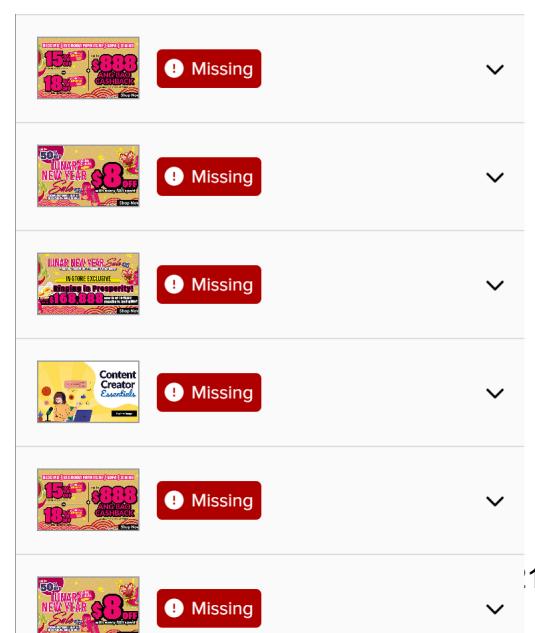
## Image Alternative Texts

Image alternative texts provide screen readers with context of the images to assist users with visual disabilities in understanding the contents of websites.



While the Courts website applies alternative texts for most of its product images, it contains a relatively large number of images that have missing alternative texts, which displays poor accessibility in some sections of the website.

This occurs more in its brand images and sales banners and does not work with screen reading tools that assist users with visual disabilities.



Similarly, the Harvey Norman website contains elements with no alternative text, and slightly more with blank alternative text. These are marked as decorative but serve no purpose in providing accessibility. However, the website also contains much fewer images, and only about a third of the images have an alternative text set.

The screenshot shows a Harvey Norman product page for an [Asus Zenbook UM3402YA-KN722W R7 16GB RAM + 1TB SSD 14-Inch Laptop](#). On the left, there's a sidebar with six items, each with a small image and a red 'Missing' button. The items are: 1. A small image with text 'monthly instalments.', 'PayLater', and 'Learn'. 2. A small image with text 'Perfect Gifting' and 'HONG BAOS'. 3. A small image with text 'HONG BAOS'. 4. A small image with text 'ORMAN makes it easy'. 5. A large grey arrow pointing left. 6. A large grey arrow pointing right. The main content area shows the laptop image, its specifications, and a red banner for a 'MASSIVE HONG BAO REBATE' with a price of **S\$1,715 inc tax** (Was S\$1,948).

With regards to providing accessibility for visually impaired users, both websites fare badly judging from their usage of alternative texts.

## WCAG

The Web Content Accessibility Guidelines is an international standard to provide more accessible web content to people with disabilities.

The Courts website lacks adherence to this standard in multiple ways listed below. Some of these have been omitted due to potential false positives.

WCAG Guideline	Issue Description	Occurrences	Severity
Image in link alt text (WCAG 2.0 A 1.1.1)	Image links in the webpage do not contain an alternative text, lacking a purpose for clicking the link.	67	Yellow
Duplicate alt text (WCAG 2.0 A 1.1.1)	Image links contain a duplicated alternative text from a text link inside or beside it.	20	Yellow

Adjacent links (WCAG 2.0 A 1.1.1)	<p>Two or more adjacent links point to the same destination.</p> <p>These usually should be combined into a single link.</p>	9	
Semantic lists (WCAG 2.0 A 4.1.1)	<p>List elements directly contain non-list items.</p> <p>This potentially breaks accessibility tools</p>	9	
Semantic links (WCAG 2.0 A 1.3.1)	<p>Lists of related items are not written semantically.</p> <p>Components that provide navigation should be rewritten as a list.</p>	2	
Link purpose (WCAG 2.0 A 2.4.4)	<p>Links contain text that do not clearly define the purpose of clicking it.</p> <p>Text such as “See More” are not useful to users with accessibility technology</p>	5	
Form control contrast (WCAG 2.1 AA 1.4.11)	<p>Form controls, or inputs, do not contrast with their surroundings.</p> <p>This makes it difficult for users with visual impairments to see them.</p>	2	
Missing H1 (WCAG 2.0 A 1.3.1)	<p>The page does not have a clearly defined heading with the <code>&lt;h1&gt;</code> element.</p> <p>This makes it harder for users to skip to the main content of the page, and do not contribute to the website's Search Engine Optimization (SEO<sub>1</sub>).</p>	1	
Duplicate IDs (WCAG 2.0 A 4.1.1)	<p>Elements on the page have duplicated IDs.</p> <p>This is not a good practice as IDs should be unique, and could stop accessibility technologies from working</p>	100	
Missing ARIA description IDs (WCAG 2.0 A 1.3.1)	<p>Accessible descriptions point to missing elements, where the description does not exist.</p>	23	
Screen reader links (WCAG 2.0 A 4.1.2)	<p>Links are not defined in a way to be accessible to screen readers as there is no</p>	9	

	<p>text content inside the link.</p> <p>Screen readers will not be able to select the link.</p>		
--	---	--	--

<sup>1</sup>Search Engine Optimization refers to improving the quality and quantity of traffic to a webpage by fine tuning the contents of a webpage indexed by the search engine.

While the Harvey Norman website also displays a lack of accessibility in some sections.

WCAG Guideline	Issue Description	Occurrences	Severity
Skip to content (WCAG 2.0 A 2.4.1)	The website does not provide a link to skip to the main content of the website	1	Red
Image in link alt text (WCAG 2.0 A 1.1.1)	Image links in the webpage do not contain an alternative text, lacking a purpose for clicking the link.	27	Yellow
Link purpose (WCAG 2.0 A 2.4.4)	Links contain text that do not clearly define the purpose of clicking it.  Text such as “See More” are not useful to users with accessibility technology	10	Yellow
Field labels (WCAG 2.0 A 1.3.1)	Labels for form controls such as inputs or buttons are not explicitly defined.  Screen readers are not able to read the layout of the form causing confusion for users	14	Yellow
Semantic lists (WCAG 2.0 A 4.1.1)	List elements directly contain non-list items.  This potentially breaks accessibility tools	2	Yellow
Programmatic field purpose (WCAG 2.1 AA 1.3.5)	Fields do not identify their purpose programmatically  Browsers are not able to help users fill in forms with known information	2	Yellow

Text contrast (WCAG 2.0 AA 1.4.3)	The color of text does not sufficiently contrast with its background color  People with moderate visual impairments are not able to read the text.	79	
Duplicate alt text (WCAG 2.0 A 1.1.1)	Image links contain a duplicated alternative text from a text link inside or beside it.	1	
Missing H1 (WCAG 2.0 A 1.3.1)	The page does not have a clearly defined heading with the <h1> element.  This makes it harder for users to skip to the main content of the page, and do not contribute to the website's Search Engine Optimization (SEO <sup>1</sup> ).	1	
Form control contrast (WCAG 2.1 AA 1.4.11)	Form controls, or inputs, do not contrast with their surroundings.  This makes it difficult for users with visual impairments to see them.	1	
Duplicate IDs (WCAG 2.0 A 4.1.1)	Elements on the page have duplicated IDs.  This is not a good practice as IDs should be unique, and could stop accessibility technologies from working	100	
Screen reader links (WCAG 2.0 A 4.1.2)	Links are not defined in a way to be accessible to screen readers as there is no text content inside the link.	34	
Links with different destinations (WCAG 2.0 A 2.4.4)	Links with the same text point to the same link  Screen readers will see links on a page without context so links with the same text should be differentiated.	87	

Examples of the above accessibility issues are as follows:

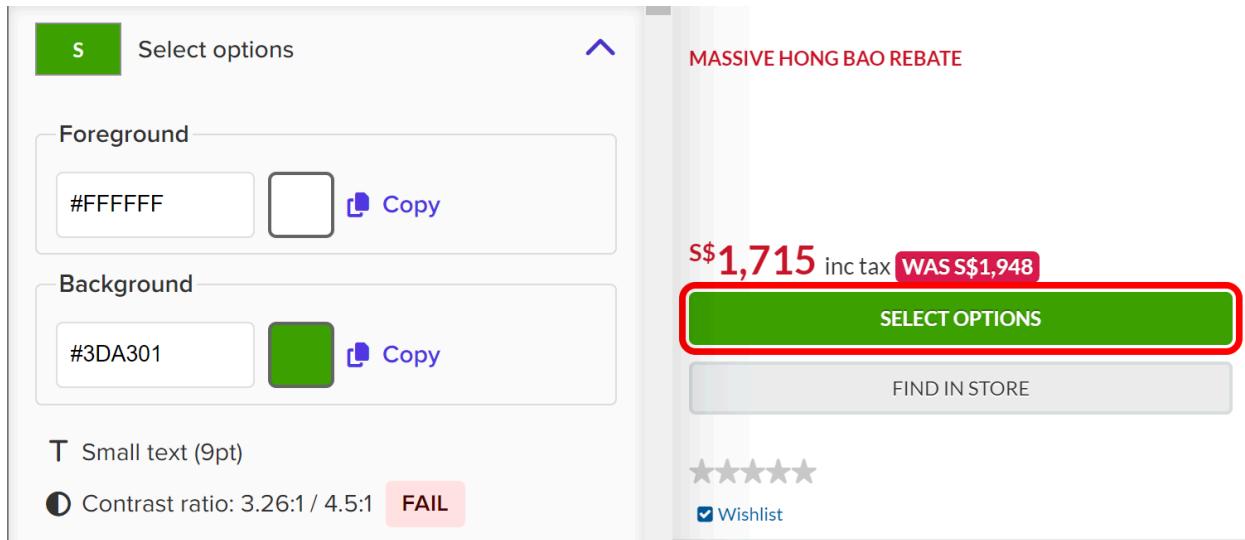


Fig 1.1 Form control contrast

## C. Responsive Design

The Courts website is responsive and provides a good and usable user interface on both wide and small screens as seen in the images provided below.

**PRICE**

\$S 400 to \$S 2,750 **GO**

**TYPE**

- Apple iPad Air (20)
- Apple iPad Pro (25)

**SCREEN SIZE**

- 10" Plus (44)
- Above 11" (25)

**STORAGE**

- 128GB (7)
- 256GB & Above (40)
- 64GB (22)

**CONNECTIVITY**

- Wi-Fi + 4G (14)
- Wi-Fi Only (35)

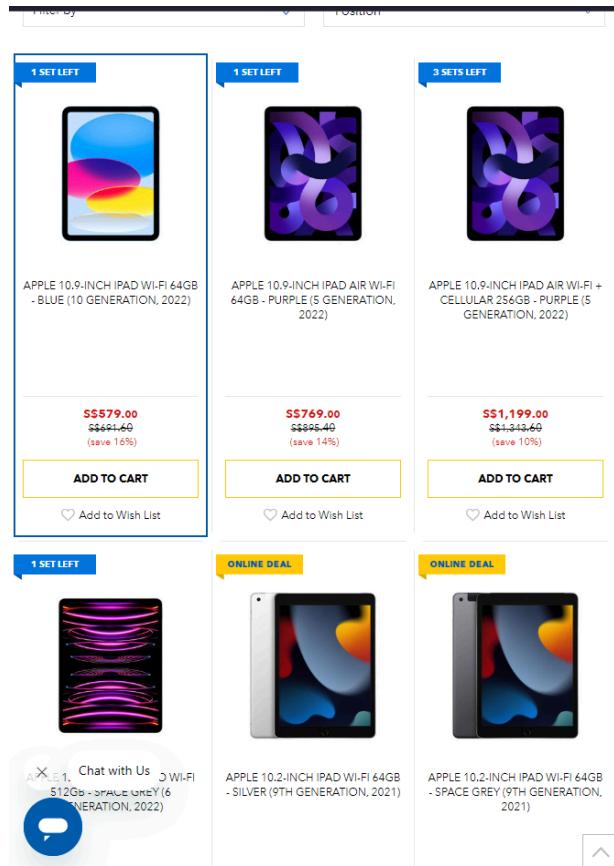
**COLOURS**

- Chat with Us
- Space Grey (3)
- Silver (5)
- Others (2)

**View as:** **Position:**

**Show:** 16 products per page

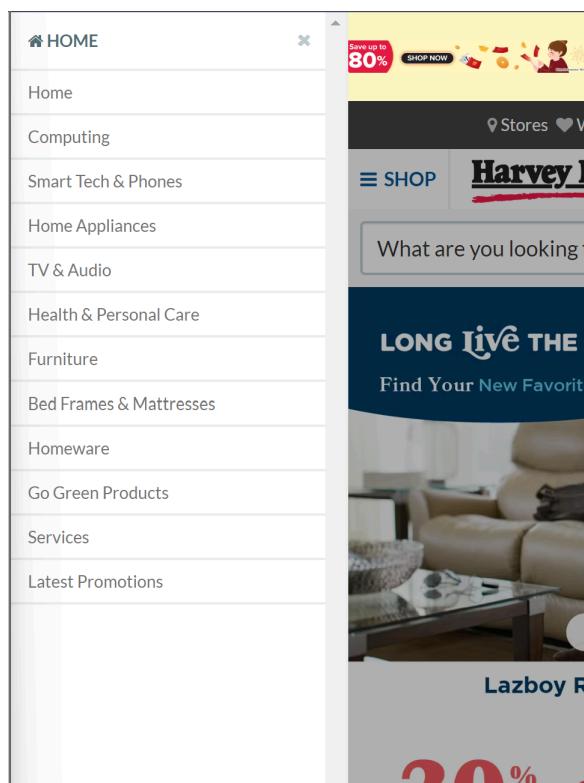
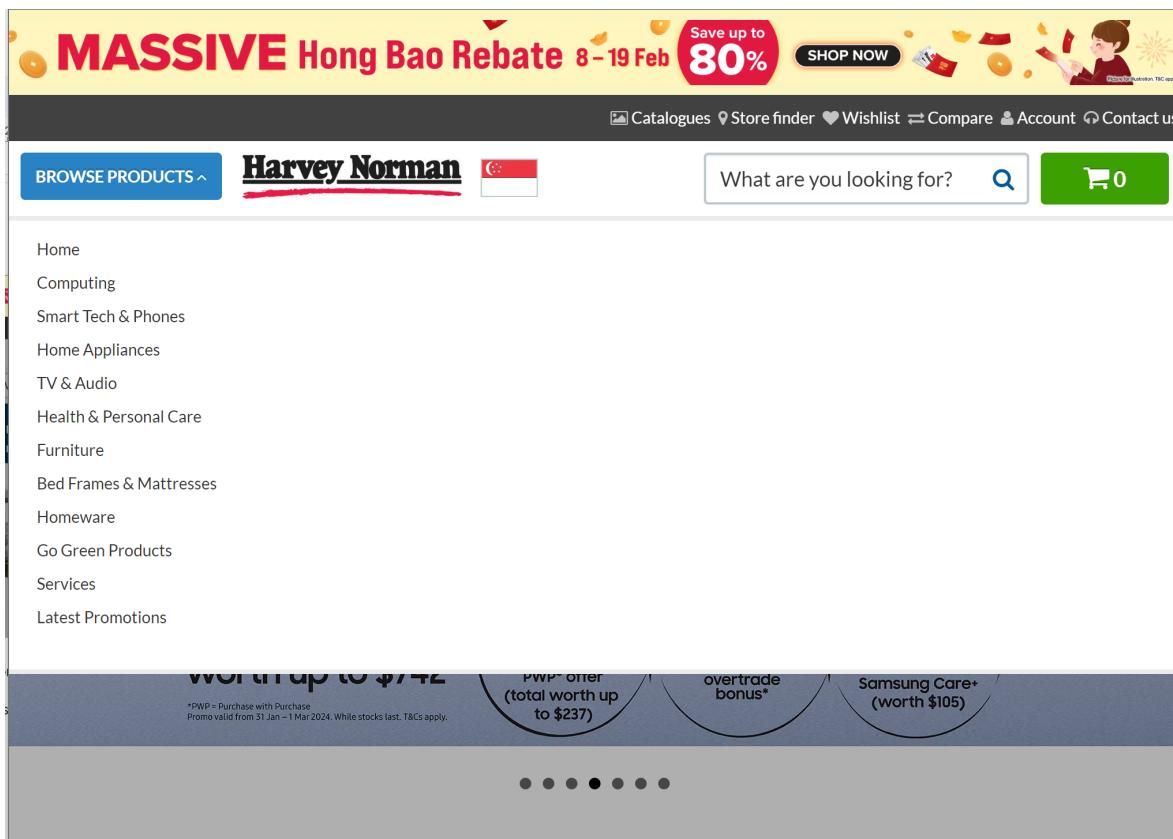
Product	Price	Availability	Add to Cart
APPLE 10.9-INCH IPAD WiFi 64GB - BLUE (10 GENERATION, 2022)	\$S579.00 \$649.00 (save 16%)	1 SET LEFT	<b>ADD TO CART</b>
APPLE 10.9-INCH IPAD AIR WiFi 64GB - PURPLE (5 GENERATION, 2022)	\$S769.00 \$899.00 (save 14%)	1 SET LEFT	<b>ADD TO CART</b>
APPLE 10.9-INCH IPAD AIR WiFi + CELLULAR 256GB - PURPLE (5 GENERATION, 2022)	\$S1,199.00 \$1,249.00 (save 10%)	3 SETS LEFT	<b>ADD TO CART</b>
APPLE 12.9-INCH IPAD PRO WiFi 512GB - SPACE GREY (6 GENERATION, 2022)	\$S2,029.00 \$2,199.00 (save 7%)	1 SET LEFT	<b>ADD TO CART</b>
APPLE 10.2-INCH IPAD WiFi 64GB - SILVER (9TH GENERATION, 2021)	<b>ONLINE DEAL</b>		
APPLE 10.2-INCH IPAD WiFi 64GB - SPACE GREY (9TH GENERATION, 2021)	<b>ONLINE DEAL</b>		
APPLE 10.9-INCH IPAD WiFi 64GB - PINK (10 GENERATION, 2022)	<b>ONLINE DEAL</b>		
APPLE 10.9-INCH IPAD WiFi 64GB - YELLOW (10 GENERATION, 2022)	<b>ONLINE DEAL</b>		



The Courts website uses a custom CSS file that provides styles for reusable HTML classes. It heavily relies on using CSS media query breakpoints to provide the website's responsiveness as, for example, the product listing uses unordered lists (`<ul>`), providing little to no built-in responsiveness capabilities.

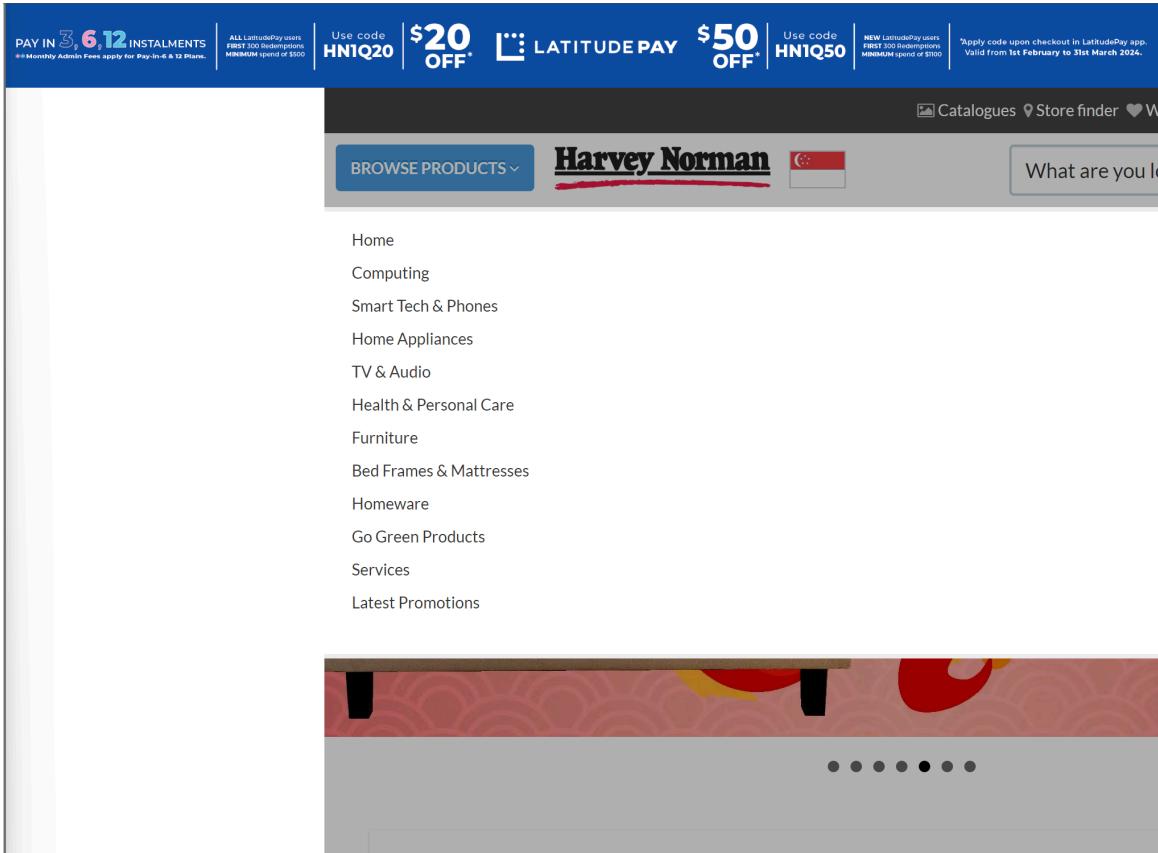
Similarly, the Harvey Norman website is also responsive for large and small screens.

The navigation menu provided changes between different screen sizes.

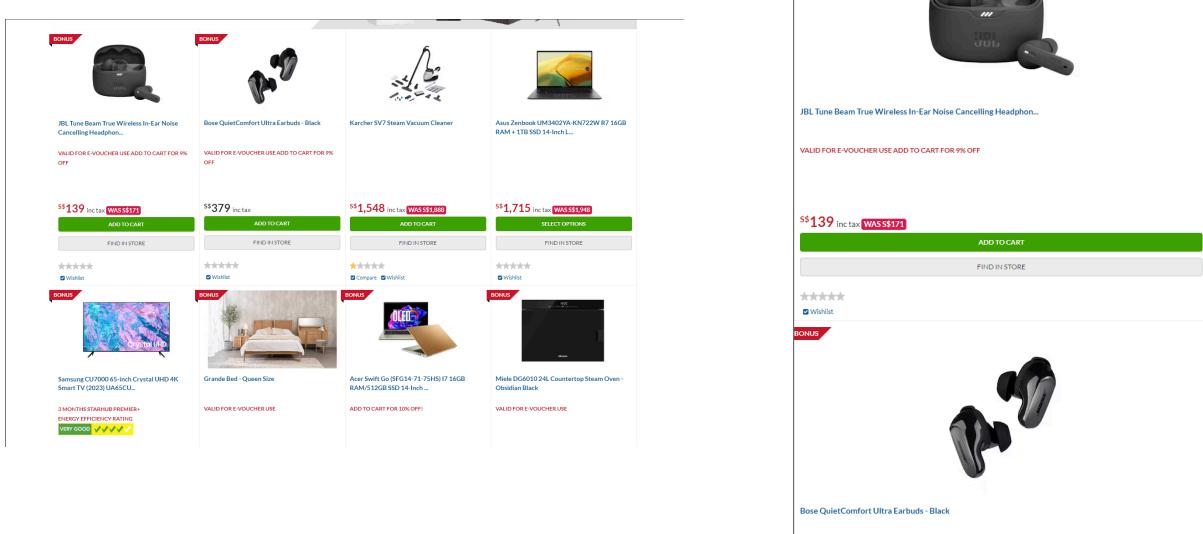


The mobile view places more focus on the navigation menu, filling up most of the screen to make it more usable and user-friendly.

However, the website does break when changing between screen sizes, such as when a browser window is being resized.



For Product Listings, the grid container wraps with the width of the page appropriately, providing an expanded view for smaller devices.



The Harvey Norman website also uses a custom CSS file that provides styles for reusable HTML classes such as the `product-grid` and `grid-col` class for its product listing page. However, in contrast to the Courts website, the CSS mainly uses flexbox to provide responsiveness, and makes use of CSS media query breakpoints to alter the CSS applied to the elements at certain viewport widths.

```

- @media screen and (min-width: 768px) {
-   .grid-col-2 .product-col {
-     border-right-width: 1px
-   }
-
-   .product-grid-recently .grid-col-3 .product-col {
-     border-right-width: 0
-   }
-
-   .product-grid-recently .grid-col-4 .product-col {
-     border-right-width: 1px
-   }
-
-   .product-grid-recommended .grid-col-4 .product-col {
-     border-right-width: 1px
-   }
-
-   .grid-col .cashback-label {
-     font-size: 11px;
-     display: inline-block;
-     width: 105px;
-     line-height: 0;
-     font-weight: normal
-   }
-
```

Overall, although the Harvey Norman website utilizes newer CSS features, it provides a less responsive user interface compared to the Courts website. This is likely due to inconsistent usage of CSS across the Harvey Norman website, and the Courts' website's large quantity of media breakpoints to account for varying screen sizes.

## D. Features & User Friendliness

### Features

The Harvey Norman website provides more complex features such as the “Find In Store” button which allows users to locate stores that hold the item they are looking for.



The Harvey Norman website is also more user friendly as it provides an enhanced search feature which caters for any typos customers might enter when searching for a product.

The screenshot shows the Harvey Norman website search results for 'ippone 15'. At the top, there are navigation links for 'BROWSE PRODUCTS', 'Harvey Norman', and a shopping cart icon showing '0'. A search bar contains the query 'ippone 15' with a magnifying glass icon. Below the search bar is a link to 'ADVANCED SEARCH' and 'SEARCH RESULTS'.

The main content area displays a message: '415 Products found 'ippone 15''. There are several filters on the left: 'CLEAR ALL FILTERS', 'Brand' dropdown (Apple, Otterbox, Belkin, Asus, ZAGG, Cygnett, N.Brandz), and 'Product Type' dropdown (iPhone Cases). The search results are shown in a grid of four items per row. Each item includes a thumbnail image, the product name, price (\$\$1,111 inc tax), original price (WAS \$1,311), a 'SELECT OPTIONS' button, and a 'FIND IN STORE' button. The total count of products is 415.

While the Courts website simply performs a static search and returns no results.

The screenshot shows the Courts website search results for 'ippone 15'. The header features the Courts logo, a search bar with 'ippone 15', and various navigation links: 'APPLIANCES', 'TV & HOME THEATRE', 'COMPUTER, TABLETS & GAMING', 'SMART TECH & PHONES', 'FURNITURE', 'SERVICES', 'BRANDS', and 'HOT DEALS'. There are also icons for 'Lowest Price Guaranteed', '14 Days Hassle-Free Exchange', 'Product Protection Plans', 'Track Your Delivery', 'Store Locator', 'Sign In', and a shopping cart with 'Cart (0)'.

The main content area shows the search results for 'IPPONE 15'. It includes a breadcrumb trail: 'Home > Search results for: 'IPPONE 15''. Below this, it says 'SEARCH RESULTS FOR: 'IPPONE 15''. A yellow banner at the bottom states: '⚠ Your search returned no results.'

The Harvey Norman website also provides more specific and context-based filters that assist users in finding exactly what they want.

The screenshot shows a product listing page for Apple iPhone 15 models. At the top, there are filters for Brand (Apple, Otterbox, Belkin, ZAGG, Cygnett, N.Brandz, Logitech), Product Type (iPhone Cases, Tempered Glass, iPhone 15, iPhone 15 Plus, iPhone 15 Pro, iPhone 15 Pro Max, Screen Protectors), Storage Capacity (1000GB (1TB), 128, 256, 512), and Price Range (\$\$ 9 - \$\$ 2496). The main area displays a grid of four iPhone 15 models per row, each with a price (e.g., \$1,111), a 'SELECT OPTIONS' button, and a 'FIND IN STORE' button. Each product card also includes a star rating (5 stars) and a 'Wishlist' checkbox. The page has a total of 257 products and is currently on page 1 of 8.

While the Courts website simply provides filters for the brands returned from the searched item.

## SEARCH RESULTS FOR: 'IPHONE 15'

74 Products Found

[Clear All Filters](#)

[View as](#) [Relevance](#)

**PRICE**

\$S\$ 50 to \$S\$ 2,400 [GO](#) [ONLINE DEAL](#)

**BRAND**

- [APPLE \(74\)](#)
- [APPLE CARE \(4\)](#)
- [BELKIN \(21\)](#)
- [MONIFILM \(4\)](#)



IPHONE 15 128GB GREEN

## Aesthetics

The Courts website provides more aesthetic appeal with its more modern looking user interface.

103 Products Found

[View as](#) [Relevance](#) [Show 16 products per page](#)

**PRICE**

\$S\$ 0 to \$S\$ 2,400 [GO](#) [ONLINE DEAL](#)

**BRAND**

- [APPLE \(74\)](#)
- [APPLE CARE \(4\)](#)
- [BELKIN \(21\)](#)
- [MONIFILM \(4\)](#)

			
IPHONE 15 128GB GREEN	IPHONE 15 128GB BLUE	IPHONE 15 128GB PINK	IPHONE 15 128GB YELLOW
<b>\$S\$1,078.00</b> \$S\$1,311.00 (save 17%)	<b>\$S\$1,078.00</b> \$S\$1,311.00 (save 17%)	<b>\$S\$1,078.00</b> \$S\$1,311.00 (save 17%)	<b>\$S\$1,078.00</b> \$S\$1,311.00 (save 17%)
<a href="#">ADD TO CART</a>	<a href="#">ADD TO CART</a>	<a href="#">ADD TO CART</a>	<a href="#">ADD TO CART</a>
<a href="#">Add to Wish List</a> <a href="#">Add to Compare</a>	<a href="#">Add to Wish List</a> <a href="#">Add to Compare</a>	<a href="#">Add to Wish List</a> <a href="#">Add to Compare</a>	<a href="#">Add to Wish List</a> <a href="#">Add to Compare</a>

In contrast, the Harvey Norman website uses relatively more generic styles, similar to that of bootstrap, where the HTML structure and basic CSS are apparent. This design is outdated and less aesthetic.

257 Products found 'iphone 15'

CLEAR ALL FILTERS
1 2 3 4 5 6 7 8 >

Brand
MOST RELEVANT
20 PER PAGE
257 Products



**Apple iPhone 15 128GB Black**  
MTP03ZP/A



**Apple iPhone 15 128GB Pink**  
MTP13ZP/A



**Apple iPhone 15 128GB Yellow**  
MTP23ZP/A



**Apple iPhone 15 128GB Blue**  
MTP43ZP/A

SHOW MORE
SELECT OPTIONS
FIND IN STORE
SELECT OPTIONS
FIND IN STORE
SELECT OPTIONS
FIND IN STORE

Product Type
iPhone Cases

Overall, the Harvey Norman website provides more features and is more user-friendly, while the Courts website is simply more aesthetic.

## E. Security

### SSL

Both the Courts and Harvey Norman websites use SSL to make their website more secure through HTTPS (Hypertext Transfer Protocol Secure), encrypting all communications between the user and the website. This protects the user from Man-in-the-middle attacks, preventing leaks of personal information.

### Form inputs

#### Search Fields

The Courts website successfully encodes user inputs to prevent client-side attacks such as Cross-Site Scripting<sub>2</sub> (XSS)

The screenshot shows the homepage of The Courts website. At the top, there is a yellow header bar with the 'COURTS' logo. Below it is a navigation bar with categories: APPLIANCES, TV & HOME THEATRE, COMPUTER, TABLETS & GAMING, SMART TECH & PHONES, FURNITURE, SERVICES, BRANDS, and HOT DEALS. On the right side of the header are links for Track Your Delivery, Store Locator, Sign In, and Cart (0). The main content area features several promotional banners: 'Lowest Price Guaranteed', '14 Days Hassle-Free Exchange - Online or in all Stores!', 'Product Protection Plans for up to 6 Years!', and 'Serving Singapore for 49 Years'. Below these banners, a search bar contains the encoded input: '!@#\$%^&\*()\_-+=[]\';./{}|:<>?'. The search results page shows the URL 'SEARCH RESULTS FOR: !@#\$%^&\*()\_-+=[]\';./{}|:<>?' and a message: 'Your search returned no results.'

The Harvey Norman website successfully sanitizes user inputs on the backend, encoding them and even filtering out characters that could potentially lead to HTML injection or XSS<sub>2</sub> attacks on the frontend. This protects the website from client-side attacks.

<sup>2</sup>Cross-Site Scripting attacks are client-side attacks that aim to steal victims' browser sessions, deface websites, or phish users' personal information.

With the lack of an error message or unexpected behaviour on the website, it is unlikely that any form of SQL injection or backend exploitation is possible, especially without more complex techniques that may get flagged.

## Authentication Forms

The Courts website provides client side validation on its login and registration forms.

**CREATE NEW ACCOUNT**

Fields marked with (\*) are mandatory

Name *	<input type="text" value="!@#\$%^&amp;*()_+-=[\v,\,]{&lt;&gt;}"/>
Please use only letters (a-z or A-Z), numbers (0-9) or spaces only in this field.	
Mobile Phone *	<input type="text" value="!#%\$%^&amp;*()_+-=[\v,\,]{&lt;&gt;}"/>
Date of Birth	January <input type="text" value="01"/> 1996 <input type="text" value="1996"/>
Email Address *	<input type="text" value="!@#\$%^&amp;*()_+-=[\v,\,]{&lt;&gt;}"/>
Please enter a valid email address (Ex: john Doe@domain.com).	
Password *	<input type="password" value="*****"/>
Password Strength: Weak Minimum of different classes of characters in password is 3. Classes of characters: Lower Case, Upper Case, Digits, Special Characters.	
Confirm Password *	<input type="password" value="*****"/>

**SIGN IN WITH EMAIL**

Email Address *	<input type="text" value="!@#\$%^&amp;*()_+-=[\v,\,]{&lt;&gt;}"/>
Please enter a valid email address (Ex: john Doe@domain.com).	
Password *	<input type="password" value="*****"/>
<b>LOGIN</b>	
Forgot Password?	
New user? Create an account	

It validates the name and email fields, and provides restrictions and guidelines on the password.

Upon submission, it validates the phone number on the registration page, checking that it is:

- 8 characters
- Begins with an '8' or '9'

- A valid number

## CREATE NEW ACCOUNT

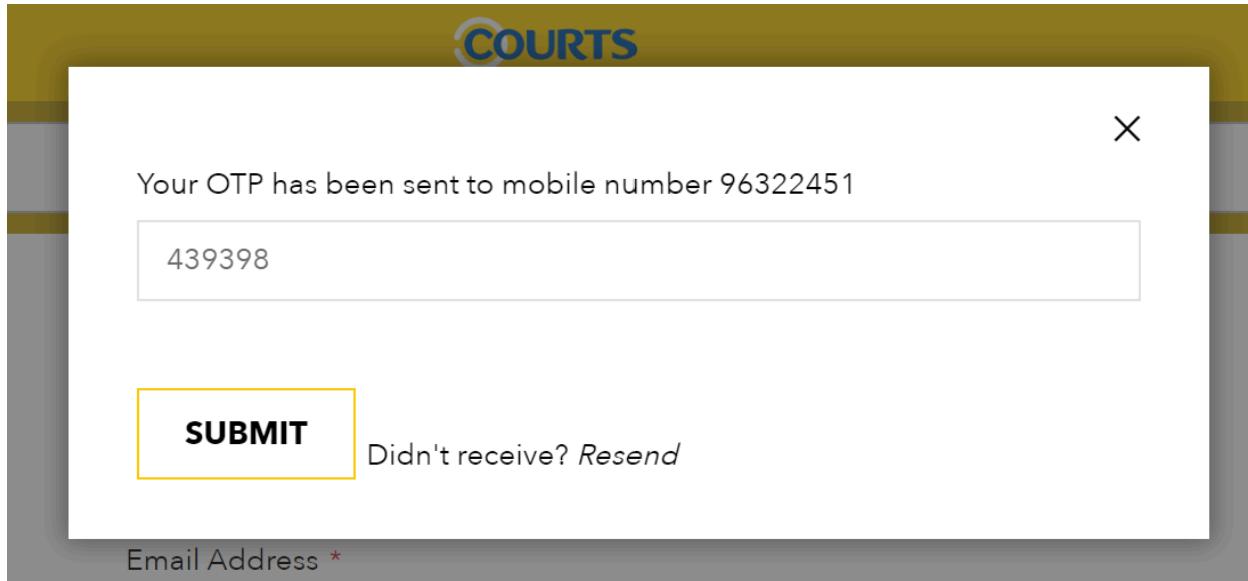
*Fields marked with (\*) are mandatory*

Name \*

Mobile Phone \*

Please enter exactly 8 characters.

Upon valid submission, it also sends a One-Time Pin to the phone number for the user to validate ownership before registering.



The Harvey Norman website also provides client side validation on both its login and registration forms, preventing any invalid input from easily reaching the backend.

Register for a new account

The screenshot shows a registration form titled "Register for a new account". It has two sections: "Enter details" and "Anti-bot validation".

- Enter details:**
  - First name: !@#\$%^&\*()\_+-=[\;,/\;]:;"<>?
  - Last name: !@#\$%^&\*()\_+-=[\;,/\;]:;"<>?
  - Email \*: !@#\$%^&\*()\_+-=[\;,/\;]:;"<>? (highlighted in red)
  - The email address in the Email field is invalid.
  - Password \*: \*\*\*\*\*
  - Confirm password \*: \*\*\*\*\*
  - Anti-bot validation \*: B4D 84 (with a CAPTCHA image showing B 4 D 8 A C)
  - Type the characters you see in the picture above.
- Anti-bot validation:** B4D 8A C

It also contains a captcha to ensure that bots or automated scripts are prevented from spamming the registration.

The screenshot shows a "My Account" page with a sidebar menu:

- My account information
  - My orders
  - My wishlist
  - Sign out

The main content area is titled "Profile details" and includes:

- User account information: Email \*: janedoe@gmail.com, CHANGE PASSWORD button
- Contact information: First name: !@#\$%^&\*()\_+-=[\;,/\;]:;">?, Last name: !@#\$%^&\*()\_+-=[\;,/\;]:;">?

The backend seems to escape user input, ensuring security against any backend or API exploitations through injection.

Both websites are minimally protected against client side attacks, with the Harvey Norman website going the extra mile by sanitizing the input. To prevent automated attacks, the Harvey Norman website also implemented a CAPTCHA system.

## Internet Hygiene Portal

The Cybersecurity Agency of Singapore (CSA) provides an online portal to assess the internet hygiene of websites.

The Courts website achieved a 79% score, and the following issues were flagged by the portal:

- **HTTP Compression Enabled**

This allows attackers to use compression sizes to monitor traffic between the website and its visitors

**HTTP Compression**

**Scan Result:**

Your web server is configured to enable HTTP Compression.

Web Server IP Address	151.101.1.124
HTTP Compression	Enabled

**Impact:**

With HTTP Compression enabled, your website is susceptible to BREACH (Browser Reconnaissance and Exfiltration via Adaptive Compression of Hypertext) - attacks. BREACH attacks steal information about how data is encrypted from HTTPS-enabled web applications.

- **Sufficient Strength of TLS Cipher Suites**

The strength of the cipher suites supported by the website are just sufficient and can be improved

**TLS Cipher Suites**

**Scan Result:**

Your web server uses TLS Cipher Suites with sufficient security strength.

Web Server Address	151.101.1.124
Cipher	TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256[X25519], TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384[secp256r1], TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256[secp256r1]
Strength	Sufficient

- **Lack of DNSSEC**

This causes users who visit the website to be susceptible to DNS spoofing attacks where

they may be redirected to malicious websites through the Harvey Norman domain.

## ✖ Web Domain Security

Try harder! Your web domain is insufficiently or not secure because it is not signed and validated with Domain Name System Security Extensions (DNSSEC).

Implement DNSSEC to protect your visitors from DNS spoofing (redirection to malicious websites).

Expand the checks below for more details:

DNSSEC

✖ DNSSEC Validity

The Harvey Norman website also attained a score of 79%, with the same issues as the Courts website.

A Singapore Government Agency Website

CSR SINGAPORE | Internet Hygiene Portal

HEALTH CHECK REPORT CARD

**www.harveynorman.com.sg**

Latest scan: 09 February 2024 at 14.04

79 %

Save report as PDF

- ! Website Connection is insufficiently secured.
- ✖ Web Domain is insufficiently or not secured.
- i Modern IP Address (IPv6) support is not available.

However, it does implement stronger TLS cipher suites, making it slightly better in protecting data transmitted over HTTPS.

 **TLS Cipher Suites** ^

**Scan Result:**

Your web server uses secure TLS Cipher Suites with strong security strength.

Web Server Address	45.60.200.212
Cipher	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384[secp256r1], TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256[secp256r1]
Strength	Sufficient

Web Server Address	45.60.200.212
Cipher	TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384[secp256r1], TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256[secp256r1]
Strength	Strong

## Web Application Firewalls

A Web Application Firewall (WAF) provides websites with protection against various client-side and server-side attacks including cross site scripting, illegal resource access and other OWASP top 10 threats, SQL injections, comment spam, fake registrations, malicious bots, referrer spam, site scraping and more.

The courts website was seemingly not protected by a WAF as it did not show any obvious signs such as error messages or warnings.

However, the Harvey Norman website was protected by [Incapsula](#), a cloud-based application delivery platform that provides a WAF that blocked my web scraper's attempts to find broken links.

## Recommendations

- Both websites are made with custom CSS styles that look outdated and hardcode their responsive breakpoints. Although this makes the website usable and slightly user-friendly, there are better and more modern ways to develop a more aesthetic, user-friendly and accessible website.

For simple and quick frontend development, the developers could utilize CSS frameworks that have these capabilities built in, such as Tailwind CSS.

Developers using React or any of its variants could also make use of UI libraries such as NextUI and Material UI to create an inherently responsive website, then apply their custom styles to the components to match their branding.

- Both websites have accessibility issues that can be easily fixed by using tools to scan and locate problems in the websites' code.
- Security should not be a compromise when it comes to web applications, all data should be validated, and a Web Application Firewall should be implemented to harden its defense.

## Conclusion

### Quality & Standards

The Harvey Norman website had a higher quality of code, conforming more to HTML5 standards compared to the Courts Website.

### Accessibility

The Harvey Norman website was also more accessible as it adhered more to WCAG guidelines as compared to the Courts website, which could also be due to the Courts website being relatively larger and more content-heavy.

### Responsive Design

Although the Harvey Norman website used both flexbox and media queries to provide responsiveness, it still broke at certain viewports and the Courts website outmatched it with just media queries.

### Features & User Friendliness

The Harvey Norman website was more user friendly, providing features that improved the overall user experience. While the Courts website presented a more aesthetic and modern-looking user interface.

### Security

While the Courts website was sufficiently secure, preventing client-side and possible server-side attacks, and implementing SSL and other security configurations, the Harvey Norman website was more secure overall, providing better SSL cryptographic security, implementing a Web Application Firewall to provide enhanced security, and implementing CAPTCHAS to prevent automated attacks or scripts.

In conclusion, the Harvey Norman website is generally better, only losing out to the Courts website in its lackluster user interface and relatively less effective responsive design. The Harvey Norman website beats the Courts website in its Quality and Standards of code, Accessibility, User Experience, and Security.