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Introduction

In the previous number of tasks, our focus has been on the technical details of developing apps using the MERN stack. In this task, we take a step back and look at the bigger picture. We consider why we build apps and how analytics can help us to build more effective applications and software products.

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Remember that with our courses, you're not alone! You can contact an expert code reviewer to get support on any aspect of your course.

The best way to get help is to login to Discord at **https://discord.com/invite/hyperdev** where our specialist team is ready to support you.

Our team is happy to offer you support that is tailored to your individual career or education needs. Do not hesitate to ask a question or for additional support!

DIGITAL ANALYTICS

Imagine yourself with your dream web development job. What types of web applications do you think you will be building? There are a host of different types of web applications you could be involved in building from e-commerce sites, to sites to disseminate information, sites to advertise products, and even online learning platforms and games. The majority of web applications are created for the marketing and selling of products and/or services. Sometimes the web applications are products themselves.

A software product can be thought of as a product that is mainly made up of software that can be "offered to a market for attention, acquisition, use, or consumption that might satisfy a want or need" (Kotler et al. 2010). The market for a software product is any group of people or organisation with similar needs that will pay for the product. Since there are so many different software products available today, software product designers and software product managers have to find novel ways to add ever-increasing value to organisations to make sure that their software product remains competitive and can be marketed in a way that will make a profit. According to Fricker, "Software product management is the discipline, which governs a software product from its inception to its close-down to generate as large a value as possible for the business" (2012).

No matter whether the web applications you develop are software products or are used to sell other products or to provide a service, chances are that you are going to want to be able to find out how well your web application is doing at meeting its goals. For example, is it popular? How many people are accessing your website? Where are these people from? How often do they sign up for special offers or purchase what you are trying to sell? Where and when do they engage with your site and when do they stop engaging with your site? Is there something on your site that is particularly popular or unpopular? Being able to answer questions such as these will help you to improve your website and can be done through something known as digital analytics. Digital analytics allows you to gather and analyse the data needed to be able to answer such questions.

There are several software solutions available to help you with digital analytics. Two of the more popular solutions are **Google Analytics** and **Facebook Analytics**. To better understand the type of data that is collected for digital analytics, it is important to first understand the concept of a purchasing funnel.

PURCHASING FUNNEL

We will be referring to a purchasing funnel but the concepts covered here can also be used to describe the principles that govern other types of funnels, such as sales funnels, customer funnels, or marketing funnels. All these funnels are designed to describe your customer's journey from becoming aware of your product to becoming a loyal customer. Some funnels break the journey up into more steps and some into less, but the general stages are more or less the same.

Google describes the purchasing funnel in terms of these 3 core steps: acquisition, behaviour, and conversion.

Image source: **https://support.google.com/analytics/answer/6383002**
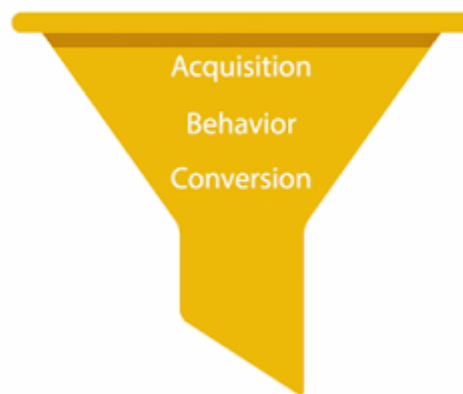
- **Acquisition:** has to do with *acquiring* user awareness and interest in your site. At this stage, users are getting to know about your website and what it offers. The goal of this stage of the funnel is to increase traffic to your site and increase user awareness of your brand. You also want this stage to lead to the next step in the funnel.
- **Behaviour:** at this stage, your user engages with your business. Most users don't go from the acquisition stage of the funnel straight to the conversion stage. The goal of this intermediate stage of the funnel is to build a relationship with your user. Free content or special deals are examples of low-risk interactions that encourage user engagement.
- **Conversion:** has to do with *converting* a user into a customer. Your goals at this stage are also to build customer loyalty and brand advocacy. This is accomplished by providing the user with a good customer experience.

COLLECTING AND ANALYSING DIGITAL DATA

Understanding the purchasing/conversion funnel, as described in the previous sections, helps us understand the types of information that analytics tools like those used by Google and Facebook collect. Analytics tools help us collect data that allows us to understand how users engage with our site. These tools help us monitor where within the purchasing funnel our users are and where the problems with converting users into customers occurs. Each tool collects this data in different ways. In this task, we will learn how Google Analytics collects data.

To use Google Analytics you need 2 things: 1) a Google Analytics account and 2) to add some tracking JavaScript to your code. This tracking code then collects anonymous data about how the user is interacting with the site and data from the user's browser including data such as where the user is located and which language the browser is set to. Once the tracking code has collected all the data about a user's session on your website, it packages the data and sends it to Google Analytics so that it can be analysed and processed. You are then able to see information about user interaction with your site in a meaningful way. You can configure the type of data that you want to collect with Google Analytics.

*Image source: **https://support.google.com/analytics/answer/6383007***

USING GOOGLE ANALYTICS

Look **here** to get an overview of what you need to do to get Google Analytics to work properly. We will work through each of these steps in this task.

Google has provided some very informative videos to help users start working with Google Analytics. Check these out **here**.

Step 1: Sign up for Google Analytics **here**. You will need a Google account in order to use Google Analytics.

You will then be taken to the following page where you will need to fill in an account name for a new account where you will add properties. Properties are generally websites or web applications that you would like to track. You can create an account name that makes sense to you. You need to know the URL of the website you want to gather data about before you can set up and configure your Google Analytics account. You, therefore, need to have deployed your app before you can use Google Analytics. This makes sense because you can't analyse users' interaction with your site before those users can access your site.

Under the Account details section, there are some checkboxes. Make sure that all the checkboxes are selected. Take particular notice of the "Google Products and Services" section as this needs to be selected in order to get some insight on users that have the Ads Personalisation turned on. Then click on the "Next" button.

In the next section called "Property Details", you will need to add the "Property Name". This can be a name that refers to your website or web application. Also, make sure to select the correct time zone and currency that your website may deal with. **Do not click on the next button yet**.

Property details

A property represents a business's web and/or app data. An account can contain one or more properties. Learn more
*Navigate to your Firebase account if you want to create a new property for an existing Firebase project.

Create a Google Analytics 4 property to measure your web and/or app data.

Property name

Property name is required.

Reporting time zone

South Africa ▾   (GMT+02:00) South Africa Time ▾

Currency

South African Rand (ZAR ZAR) ▾

You can edit these property details later in Admin

Click on "Show advanced options" and make sure to toggle the switch for "Create a Universal Analytics property" to on. This is to include some of the features from the previous version of Google Analytics and is important for a more in-depth analysis of activities on your site or application. After having done so, add the URL of your website and make sure that the "Create both a Google Analytics 4 and a Universal Analytics property" and "Enable enhanced measurement for Google Analytics 4 property" options are both selected. Do not select "Create a Universal Analytics property only". This is because you would want to use the feature of both Google Analytics V4 as well as the previous version. Once done, you can click on the "Next" button.

Hide advanced options

Create a Universal Analytics property

The Universal Analytics property is a part of an earlier version of Google Analytics and only supports web measurement. It isn't recommended for new Analytics users, and it won't support app measurement. Turn this on if you'd like to create a Universal Analytics property.

Website URL

https:// ▾   www.mywebsite.com

◉ Create both a Google Analytics 4 and a Universal Analytics property
This will create two properties with connected site tags, so you only need to tag your website once. Learn more
☑ Enable enhanced measurement for Google Analytics 4 property
Automatically measure interactions on your sites in addition to standard screen view measurement.
Data from on-page elements such as links and embedded videos may be collected with relevant events. You must ensure that no personally-identifiable information will be sent to Google. Learn more
○ Create a Universal Analytics property only

The "About your business" section should open up. Here you can fill in details about the industry that you are in and the size of your business. You can select whatever you feel is relevant to your business if this is for a business. If it is only for a portfolio, you can select "Other" as the industry and "Small" as the business size.

For "How do you intend to use Google Analytics with your business?", you can select all of the options except for "Other". When you have completed this, you can click on the "Create" button.

A pop-up window will appear with terms and conditions that you need to agree to, and you will also need to select the correct region for where you are located. Do this and then click on "I Accept"

You will be taken to a screen that looks like the picture below. Copy the URL of this page and open a new tab using the same URL in order to have two instances of this page open. We are going to now ensure that the older version of Google Analytics and GA V4 are linked together so that we can just use one tag for both combined in our website that we would like to track.

In the second tab, close the "Web stream details" panel and click on the dropdown next to the Analytics logo at the top-left of the page.

Click on the account that you created under "Analytics" accounts. Then under "Properties and Apps", click on the property that has an ID under it that begins with a UA. Once you have done this, open "All Web Site Data" under the "Views" column.
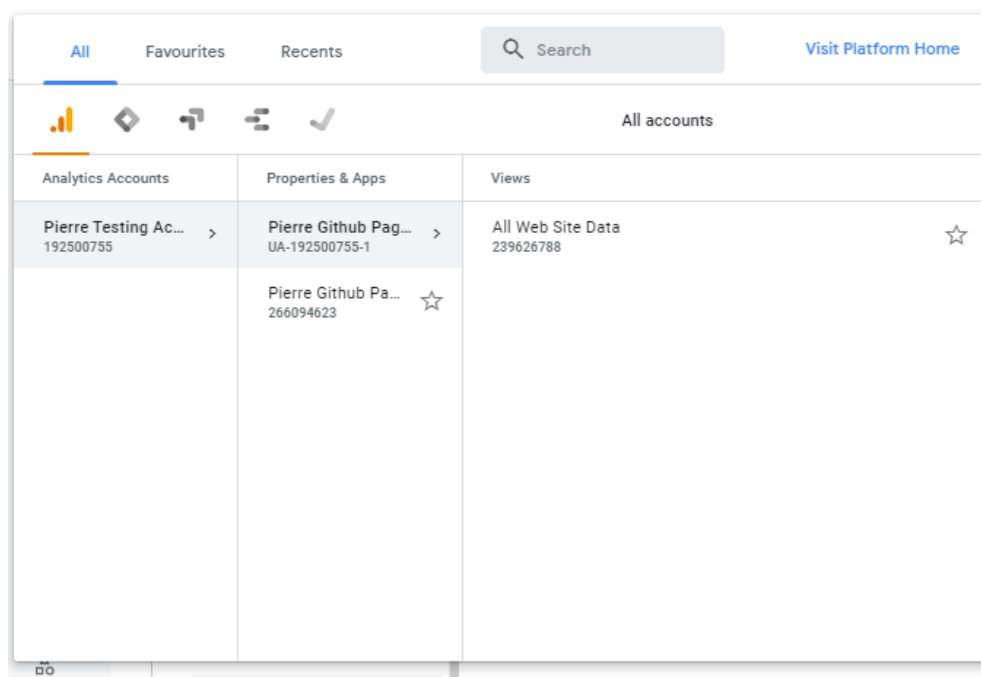
Click on the "Admin" in the bottom left corner of the page.
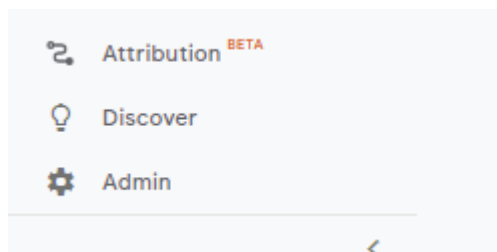
Click on "Tracking Info" and then "Tracking Code".

In the panel that opens, scroll down and click on "Connected Site Tags".
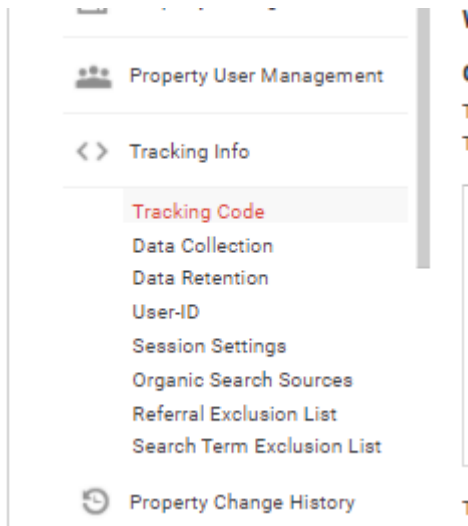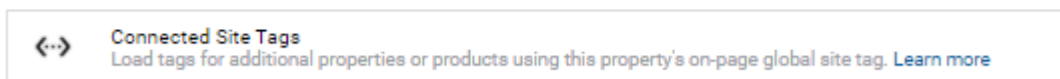

Go back to the first tab that you opened and copy the Measurement ID at the top right of the panel.
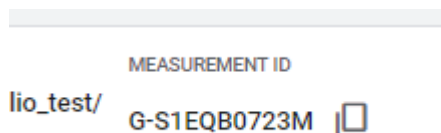
Return to the second tab and paste the Measurement ID into the section "Enter ID of tag to connect". You can also add any nickname you like in order to identify this easily in the future. After completion, click on "Connect".
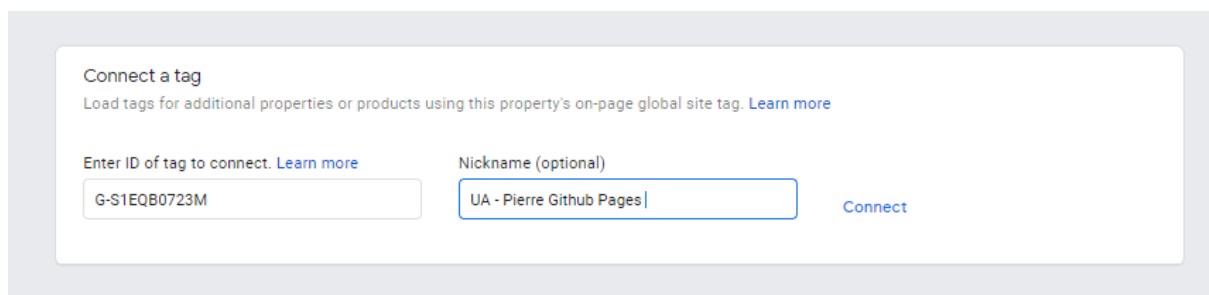
We have now connected the tracking for both the Google Analytics V4 and Universal Analytics, and we are ready to connect it to our website.

Step 2: Add tracking code to all the pages on your site that you would like to track.

We will need to add a tag into the header of all our web site pages in order to track it. First, go back to the first tab that we had open that still has the "Web stream details" panel open. Navigate to "Tagging Instructions" >> "Add new on-page ta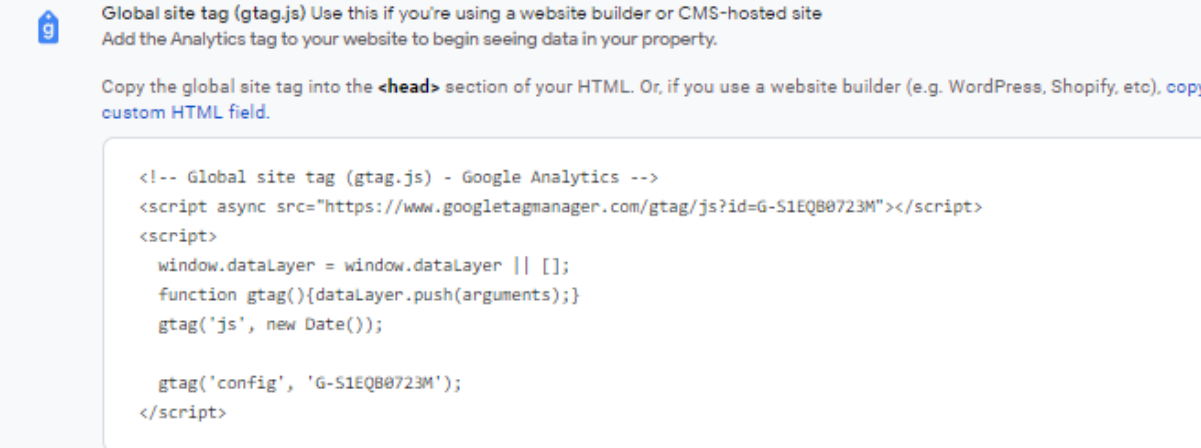g" >> "Global site tag (gtag.js)" and copy the code snippet that needs to be pasted in the <head> section of your pages. Make sure that wherever your website is deployed, that you have updated all of your website pages to have the tracking tag in the <head> section of those pages.

Step 3: Deploy the changes you have made to your code and test if it is connected properly to Google Analytics where it is hosted.

Ensure that you push the changes of your website code to wherever you have it hosted, such as Heroku or Github pages.

In order to test if the tracking script is working correctly on your website, use an incognito tab or a different browser that you are not signed into Google with, and visit your home page. Afterwards, in Google Analytics use the sidebar menu to navigate to "Realtime" >> "Overview" and in the panel that opens, you should be able to see how many users are on your page (this should at least be one as you are on the page.) You have now successfully added Google Analytics to your website.
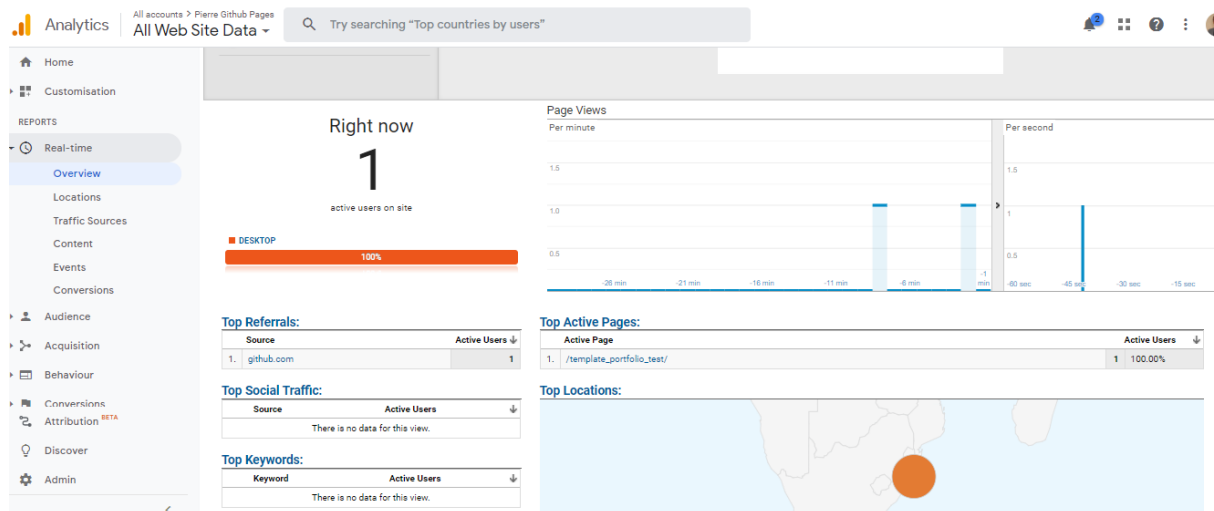
Make sure that wherever your website is deployed, that you have updated all of your website pages to have the tracking tag in the <head> section of those pages in order to be able to track behaviour on all of the pages.

Step 4: Setup your account to configure your data to meet your needs.

As can be seen in the image below, Google Analytics configures accounts as follows: Organisations that want to analyse their data can have more than one account. You would typically have a separate account for each business or business unit in an organisation. You can then also have several properties associated with each account. Each property has a unique tracking ID which you can use to create several views of your data.

Views are important because you need views in place before you can filter data or create goals. By default, Google Analytics creates a view called "All Web Site Data" that stores all the raw data collected by the tracking code you added to your app in step 2.

Image source: ***https://support.google.com/analytics/answer/6382993***

To create a new view, select "Admin" from the Google Analytics dashboard in the bottom left corner. Under the column "View" click on the "Create View" button
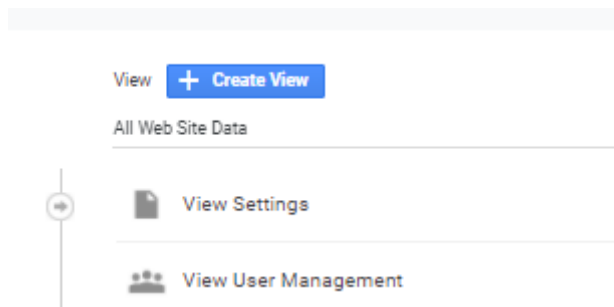
You can fill in the name of the view and the region and click on "Create View"

Once you have created a new view, you can edit the view by navigating to "View settings". You will notice that you can create views that only collect data from users with certain IP addresses or you can exclude data from bots etc. Once you have a view you can filter the data in the view.

It is also important that you know how to set up goals with Google Analytics. You can create goals that measure how your users are progressing through the purchasing funnel. To create a goal, select "Goals" under the view column that you have just created.
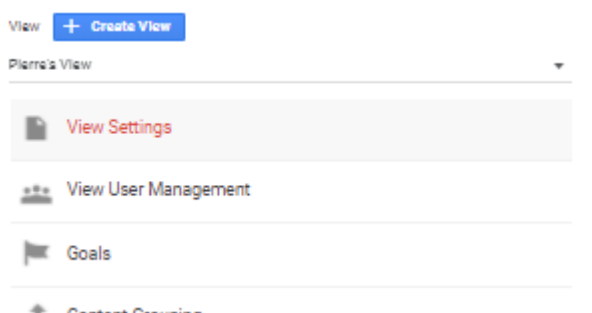
. You will see that there are 4 types of goals you can create, as shown below:

Measure a broad spectrum of user success with four different goal types.

Analytics lets you define four different types of goals that users can achieve during a session:

- **Destination**: the user reaches a specified web page or app screen.
- **Duration**: the user spends a specified minimum amount of time on your site or app.
- **Pages/Screens per session**: the user views a specified minimum number of pages or screens.
- **Event**: the user conducts a specified action, like viewing a video.

You will be creating goals in the compulsory task.

As can be seen in the image above, one of the options when creating a goal is the funnel option which can be turned on or off. If the funnel option is on, you can specify the steps in a funnel that lead to the goal. For example, to reach the goal of converting a user to a customer who purchases an item from your online store, the user may need to go from the homepage, to the page with the product information page, to the shopping cart, to the payment page and finally, to the payment confirmation page of your site. The progression through these pages would track your users' progression through the purchasing funnel. If you use the

funnel option to create a goal, you will be able to see reports that allow you to visualise your users' journey.
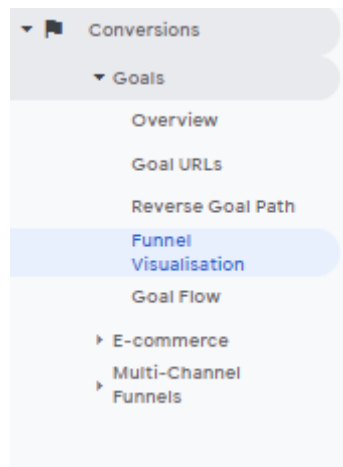
An example of what the funnel visualisation report would look like is depicted below. As you can see, this gives you an easy way to see where in your purchasing funnel you may be losing customers, which in turn can help you make changes to improve your website.

You are now about to start preparing for the start of your career as a web developer in earnest! Check out some of these blog posts which you may find helpful in this regard:
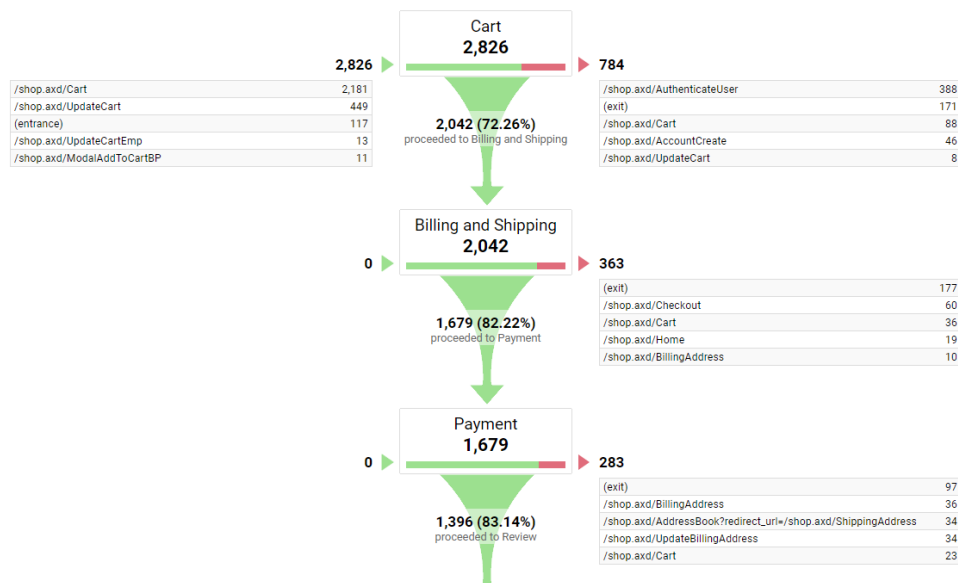
1. **Types of web development jobs to look for in 2019.**
2. **The best websites for your developer job search.**
3. **Five tips for being a remote developer.**
4. **What does it mean to become a code reviewer?**
5. **How To Negotiate Your First Salary As A Developer.**

SPOT CHECK 1

Let's see what you can remember from this section.

1. What is the purpose of having an analytics tool?

2. According to Google's purchasing funnel, what is meant by *conversion*?

Compulsory Task 1

Follow these steps:

- You have already created a developer portfolio. Make sure that your portfolio is up to date and that all the applications that you have developed are included in your developer portfolio. In this task, you are going to use Google Analytics to be able to collect information about who is visiting your developer portfolio. Once you have completed this task, HyperionDev's Student Success team will give you feedback to help you improve your developer portfolio and CV.

- Deploy your developer portfolio.

- If you have not already done so, create a Google Analytics account **here**.

- Add tracking JavaScript to your app so that you can use Google Analytics to analyse user interaction with your page.

- With Google Analytics, do the following:
  - Create a view that collects all data excluding data related to bots.
  - Create a goal that sees how many of your users have visited the contact page after visiting the homepage of your site.

- Send out an email to some friends and family and ask them to check out your developer portfolio so that they can provide feedback (Be sure to include a link to the site). Be sure to CC **success@hyperiondev.com** on this email. Give it a day or two for people to see your email and then use Google Analytics to see how many people have actually been and visited your site.

- Submit the following:
  - A document called "analytics info" that contains the following screenshots from Google Analytics:
    - A screenshot that shows all the active users to your site in the past 7 days.
    - A screenshot that shows all the active users on your website right now.
    - A screenshot of the funnel visualisation of the goal you created.

  - Also, include a brief summary that details the effect that your email campaign had on traffic to your site. How many people visited your site before the email? How many visited after the email was sent? Where did people view your site from? What devices did they use to view your site? Include relevant screenshots of the reports you used to answer these questions.

If you are having any difficulties, please feel free to contact our specialist team **on Discord** for support.

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SPOT CHECK 1 ANSWERS

1. Analytics tools help us collect data that allows us to understand how users engage with our site. These tools help us monitor where in the purchasing funnel our users are and where the problems with converting users into customers occurs. Each tool collects this data in different ways.

2. Conversion has to do with *converting* a user into a customer. Your goals at this stage are also to build customer loyalty and brand advocacy. This is accomplished by providing the user with a good customer experience.