Experiment 11

Aim: To use google Lighthouse PWA Analysis Tool to test the PWA functioning.

Theory:

Google Lighthouse:

Google Lighthouse is a tool that lets you audit your web application based on a number of parameters including (but not limited to) performance, based on a number of metrics, mobile compatibility, Progressive Web App (PWA) implementations, etc. All you have to do is run it on a page or pass it a URL, sit back for a couple of minutes and get a very elaborate report, not much short of one that a professional auditor would have compiled in about a week. The best part is that you have to set up almost nothing to get started. Let's begin by looking at some of the top features and audit criteria used by Lighthouse.

Key Features and Audit Metrics
Google Lighthouse has the option of running the Audit for Desktop as well as mobile version of your page(s). The top metrics that will be measured in the Audit are:

Performance: This score is an aggregation of how the page fared in aspects such as (but not limited to) loading speed, time taken for loading for basic frame(s), displaying meaningful content to the user, etc. To a layman, this score is indicative of how decently the site performs, with a score of 100 meaning that you figure in the 98th percentile, 50 meaning that you figure in the 75th percentile and so on.

PWA Score (Mobile): Thanks to the rise of Service Workers, app manifests, etc., a lot of modern web applications are moving towards the PWA paradigm, where the objective is to make the application behave as close as possible to native mobile applications. Scoring points are based on the Baseline PWA checklist laid down by Google which includes Service Worker implementation(s), viewport handling, offline functionality, performance in script-disabled environments, etc.

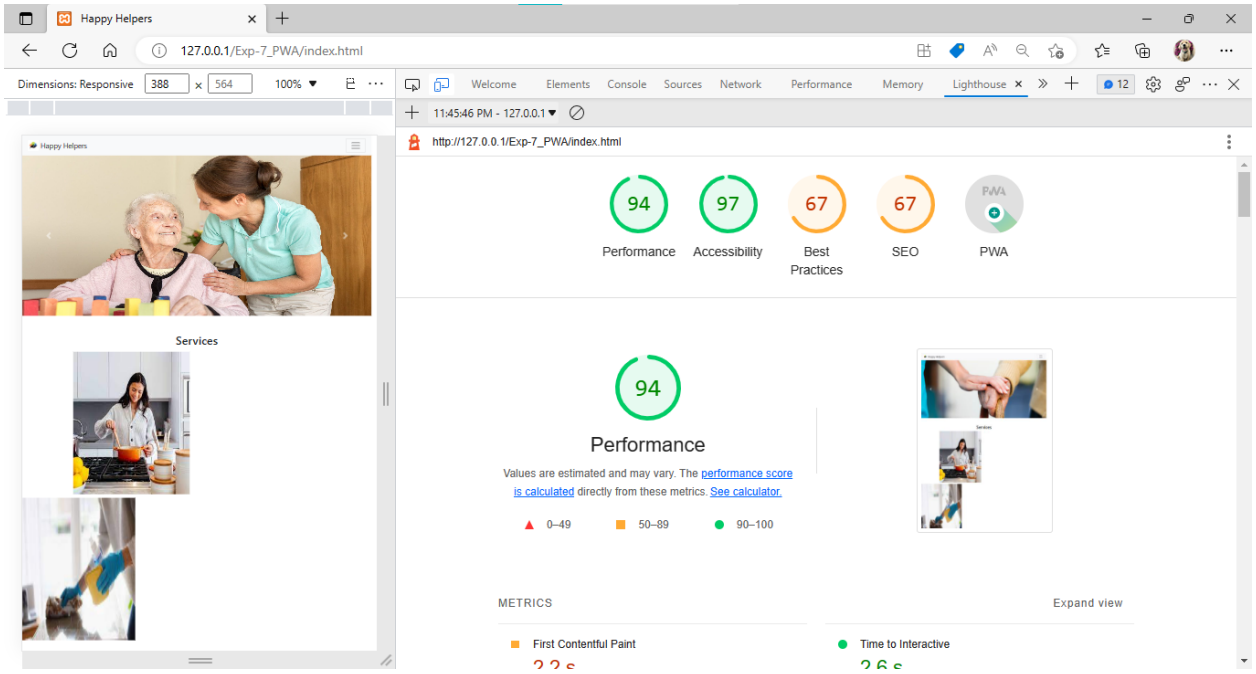
Accessibility: As you might have guessed, this metric is a measure of how accessible your website is, across a plethora of accessibility features that can be implemented in your page (such as the 'aria-' attributes like aria-required, audio captions, button names, etc.). Unlike the other metrics though, Accessibility metrics score on a pass/fail basis i.e. if all possible elements of the page are not screen-reader friendly (HTML5 introduced features that would make pages easy to interpret for screen readers used by visually challenged people like tag names, tags such as <section>, <article>, etc.), you get a 0 on that score. The aggregate of these scores is your Accessibility metric score.

Best Practices: As any developer would know, there are a number of practices that have been deemed ‘best’ based on empirical data. This metric is an aggregation of many such points, including but not limited to:Use of HTTPS
Avoiding the use of deprecated code elements like tags, directives, libraries, etc. Password input with paste-into disabled
Geo-Location and cookie usage alerts on load, etc.

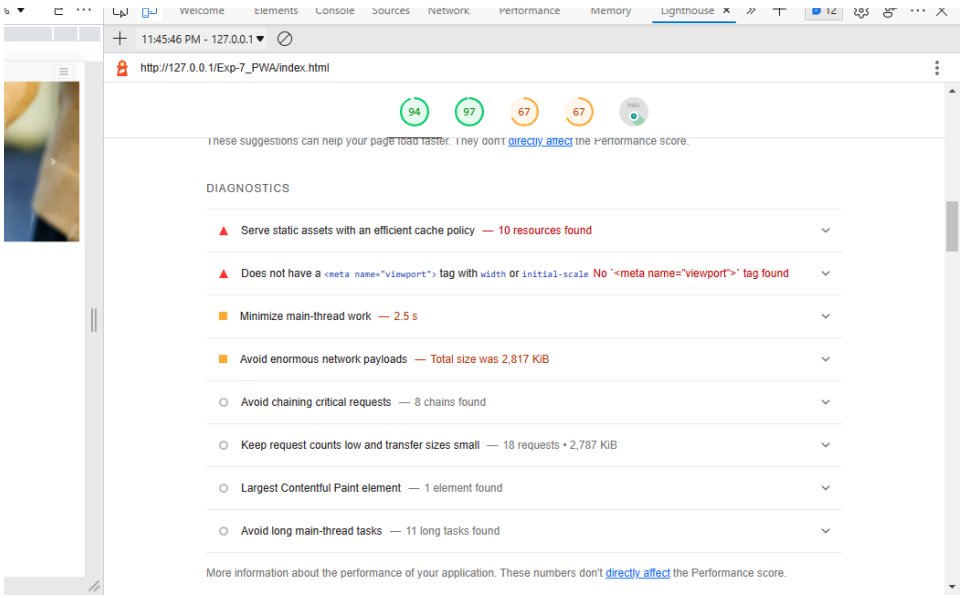
SEO: The latest and most dynamic of the highlights in Google's Lighthouse instrument is the SEO metric. PageSpeed Insights doesn't offer this tool. This is why most web designers and SEO specialists prefer to utilize Google Lighthouse to analyze a website. The SEO metric gives fundamental tools to examine your page's streamlining for search engine results rankings. While there are numerous more factors which Lighthouse doesn't consider or quantify, the most essential focuses are secured.

Progressive Web Applications: The Progressive Web App area is another of Google's most up to date execution measurements incorporated into its Lighthouse tool. While the meaning of a Progressive Web App (PWA) hasn't been especially clear, Google's documentation expresses that there are a few key variables which make a site a PWA. A great feature of this metric is registering service workers which allow you to enable push notifications on your web app.

Lighthouse for Desktop



We need to increase the performance of SEO and best practices
Changes in Code:



Manifest.json

```
{
  "name": "Happy Helpers",
  "short_name": "PWA",
  "start_url": "index.html",
  "display": "standalone",
  "scope": ".",
  "theme_color": "default",
  "description": "This is a PWA tutorial.",
  "icons": [{
        "src": "images/image.png",
        "sizes": "500x500",
        "type": "image/png"
    },
    {
        "src": "images/image.png",
        "sizes": "500x500",
        "type": "image/png"
    }
  ]
}
```

Necessary changes made in sizes of images

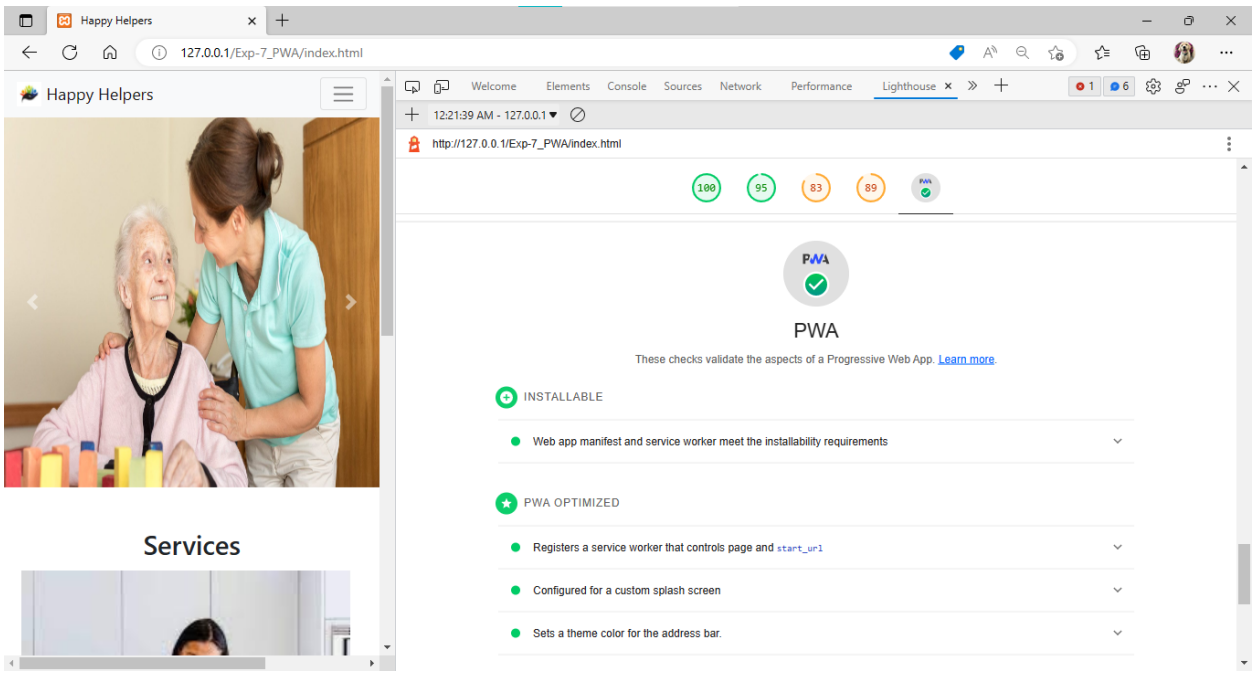
Added necessary tags in index.html

manifest.json | sw.js | index.html | app.js | serviceworker.js

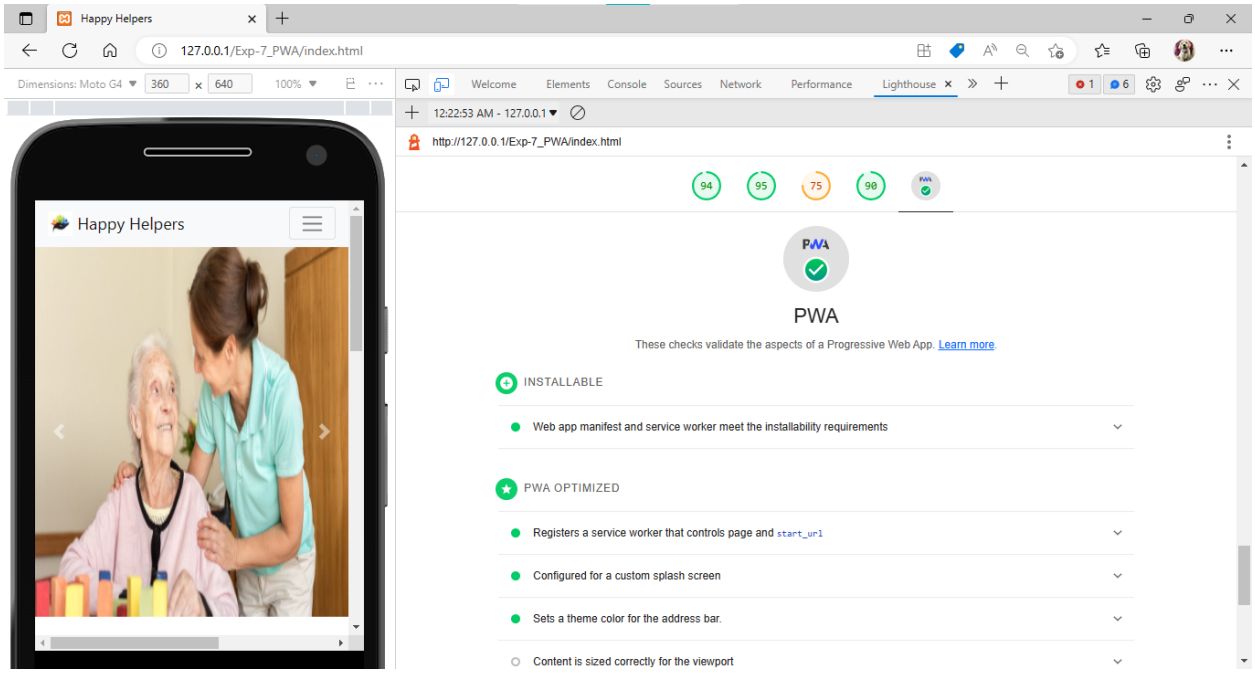
index.html > html > head > script

```
<!DOCTYPE html>
<html>

<head>
    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css" i
    <script src="https://code.jquery.com/jquery-3.2.1.slim.min.js" integrity="sha384-KJ3o2DKtIkvYIK3UENzmM7
    <script src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js" integrity="sha384-Ap
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js" integrity="sha384-J

    <title>Happy Helpers</title>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <meta name="theme-color" content="#317EFB" />
    <link rel="stylesheet" href="cart.css">
    <script src="products.js"></script>
    <script src="cart.js"></script>
    <script src="app.js"></script>
    <script>
        window.addEventListener('load', () => {
            registerSW();
        });
```

Output:



Lighthouse for Mobile



Conclusion: Thus we analyzed the happy helpers website. We checked its performance and made the necessary changes to improve it. We got the green tick which indicates that our site is PWA optimized. We successfully implemented the Google Lighthouse PWA Analysis Tool to test the PWA functioning.