

Homework 3
Unity ID- rkolhe

Question 1)

The differences in the browsers are as follows:

a) <https://panopticlick.eff.org/>

Firefox	TOR
Conveyed 15.19 bits of identifying information	Conveyed only 10.86 bits of identifying information
The timezone value is 240 where one in 10.81 browsers have this value	The timezone value is 0 where one in 6.26 browsers have this same value
The screen size is 1536x864x24 which is seen in one out of 18.94 browsers	The screen size is 100x700x24 which is seen in 188.19 browsers making it more secure than Firefox
The hash values for canvas fingerprint and WebGL fingerprints for both browsers are different	

b) <https://amiunique.org/>

Firefox	TOR
The WebGL vendor is named as Google and information about WebGL rendered and data are displayed	The WebGL renderer and Vendor are not supported
The timezone value is 240	The timezone value is 0
There is a particular HTML5 Canvas element rendered for Firefox	There is no canvas picture rendered. The canvas field is left blank
The screen dimensions are the same as shown in the above website	The screen dimensions are the same as shown in https://panopticlick.eff.org/

The screenshots are given below-

Firefox Browser Fingerprint- <https://panopticlick.eff.org>

Browser Characteristic	bits of identifying information	one in x browsers have this value	value
User Agent	3.64	12.46	Mozilla/5.0 (Windows NT 10.0; Win64; x64; rv:69.0) Gecko/20100101 Firefox/69.0
HTTP_ACCEPT Headers	1.9	3.72	text/html, */*; q=0.01 gzip, deflate, br en-US,en;q=0.5
Browser Plugin Details	0.79	1.73	undefined
Time Zone	3.43	10.81	240
Screen Size and Color Depth	4.24	18.94	1536x864x24
System Fonts	4.95	30.99	Arial, Arial Black, Arial Narrow, Arial Rounded MT Bold, Book Antiqua, Bookman Old Style, Calibri, Cambria, Cambria Math, Century, Century Gothic, Century Schoolbook, Comic Sans MS, Consolas, Courier, Courier New, Garamond, Georgia, Helvetica, Impact, Lucida Bright, Lucida Calligraphy, Lucida Console, Lucida Fax, Lucida Handwriting, Lucida Sans, Lucida Sans Typewriter, Lucida Sans Unicode, Microsoft Sans Serif, Monotype Corsiva, MS Gothic, MS Outlook, MS PGothic, MS Reference Sans Serif, MS Sans Serif, MS Serif, Palatino Linotype, Segoe Print, Segoe Script, Segoe UI, Segoe UI Light, Segoe UI Semibold, Segoe UI Symbol, Tahoma, Times, Times New Roman, Trebuchet MS, Verdana, Wingdings, Wingdings 2, Wingdings 3 (via javascript)
Are Cookies Enabled?	0.26	1.19	Yes
Limited supercookie test	0.36	1.28	DOM localStorage: Yes, DOM sessionStorage: Yes, IE userData: No
Hash of canvas fingerprint	7.37	164.93	284505a1d62598fdd63c664156e36f2b
Hash of WebGL fingerprint	4.6	24.21	9f9f79a414ddb93ae956153a9d800a02
DNT Header Enabled?	1.01	2.01	False
Language	1.0	2.0	en-US
Platform	1.33	2.51	Win32
Touch Support	0.83	1.78	Max touchpoints: 0; TouchEvent supported: false; on TouchStart supported: false

TOR Browser Fingerprint- <https://panopticklick.eff.org>

Browser Characteristic	bits of identifying information	one in x browsers have this value	value
User Agent	3.88	14.69	Mozilla/5.0 (Windows NT 6.1; rv:60.0) Gecko/20100101 Firefox/60.0
HTTP_ACCEPT Headers	1.9	3.72	text/html, */*; q=0.01 gzip, deflate, br en-US,en;q=0.5
Browser Plugin Details	0.79	1.73	undefined
Time Zone	2.65	6.26	0
Screen Size and Color Depth	7.56	188.19	1000x700x24
System Fonts	6.37	82.5	Arial, Arial Black, Arial Narrow, Cambria Math, Courier, Courier New, Georgia, Helvetica, Lucida Console, MS Gothic, MS PGothic, MS Sans Serif, MS Serif, Segoe UI, Segoe UI Light, Segoe UI Semibold, Tahoma, Times, Times New Roman, Verdana, Wingdings 2, Wingdings 3 (via javascript)
Are Cookies Enabled?	0.26	1.19	Yes
Limited supercookie test	0.36	1.28	DOM localStorage: Yes, DOM sessionStorage: Yes, IE userData: No
Hash of canvas fingerprint	2.88	7.35	a273d6a847f0e2a57fa0161158f12fed
Hash of WebGL fingerprint	6.07	67.32	224a8abee799ec6381e06293de4565f6
DNT Header Enabled?	1.01	2.01	False
Language	1.0	2.0	en-US
Platform	1.33	2.51	Win32
Touch Support	0.83	1.78	Max touchpoints: 0; TouchEvent supported: false; onTouchStart supported: false

Firefox Browser Fingerprint- <https://amiunique.org/>

Timezone ⓘ	5.27%	240
Content language ⓘ	7.12%	en-US,en
Canvas ⓘ	0.32%	Cwm fjordbank glyphs vext quiz, 😊 Cwm fjordbank glyphs vext quiz, 😊
List of fonts (JS) ⓘ	0.52%	Arial, Arial Black, Arial Narrow, Bahnschrift, Brush Script MT, Calibri, Cambria, Cambria Math, Candara, Comic Sans MS and 58 others

TOR Browser Fingerprint- <https://amiunique.org/>

Timezone ⓘ	9.89%	0
Content language ⓘ	7.12%	en-US,en
Canvas ⓘ	6.09%	


Firefox Browser Fingerprint- <https://amiunique.org/>

Screen width ⓘ	3.29%	1536
Screen height ⓘ	3.15%	864
Screen depth ⓘ	75.34%	24

TOR Browser Fingerprint- <https://amiunique.org/>

Screen left ⓘ	6.14%	0
Screen top ⓘ	6.43%	0
Screen width ⓘ	2.32%	1000
Screen available width ⓘ	0.62%	1000
WebGL Parameters ⓘ	3.05%	15 different parameters
BuildID ⓘ	0.65%	20100101

Firefox Browser Fingerprint- <https://amiunique.org/>

WebGL Vendor ⓘ	27.23%	Google Inc.
WebGL Renderer ⓘ	0.73%	ANGLE (Intel(R) UHD Graphics 620 Direct3D11 vs_5_0 ps_5_0)
WebGL Data ⓘ	1.58%	

TOR Browser Fingerprint- <https://amiunique.org/>

WebGL Vendor ⓘ	26.59%	Not supported
WebGL Renderer ⓘ	26.59%	Not supported
WebGL Data ⓘ	18.01%	Not supported

From the above comparisons, we can conclude that the TOR browser is more efficient in hiding the identity of the browser than Firefox. We can observe that there is some essential information like WebGL information is displayed in detail in the Firefox browser fingerprint whereas the TOR browser hides that information. Information related to HTML5 Canvas Element is also a major difference between the two browsers, where TOR performs better than Firefox.

Question 2)

Site	# of trackers found while using a desktop	# of trackers found while using a mobile (Android 9)	Desktop specific tracker (if any)	Mobile-specific tracker (Android 9)
cnn.com	21	31	Google Tag Manager	Yield Mo, Tradedesk, Omniture, LiveRamp
alibaba.com	2	1	Google Analytics	-
espn.com	8	18	Espn Analytics, MarkMonitor	Research Beacon, Chartbeat, Scorecard, NetRatings Site Census, Moat, Doubleclick

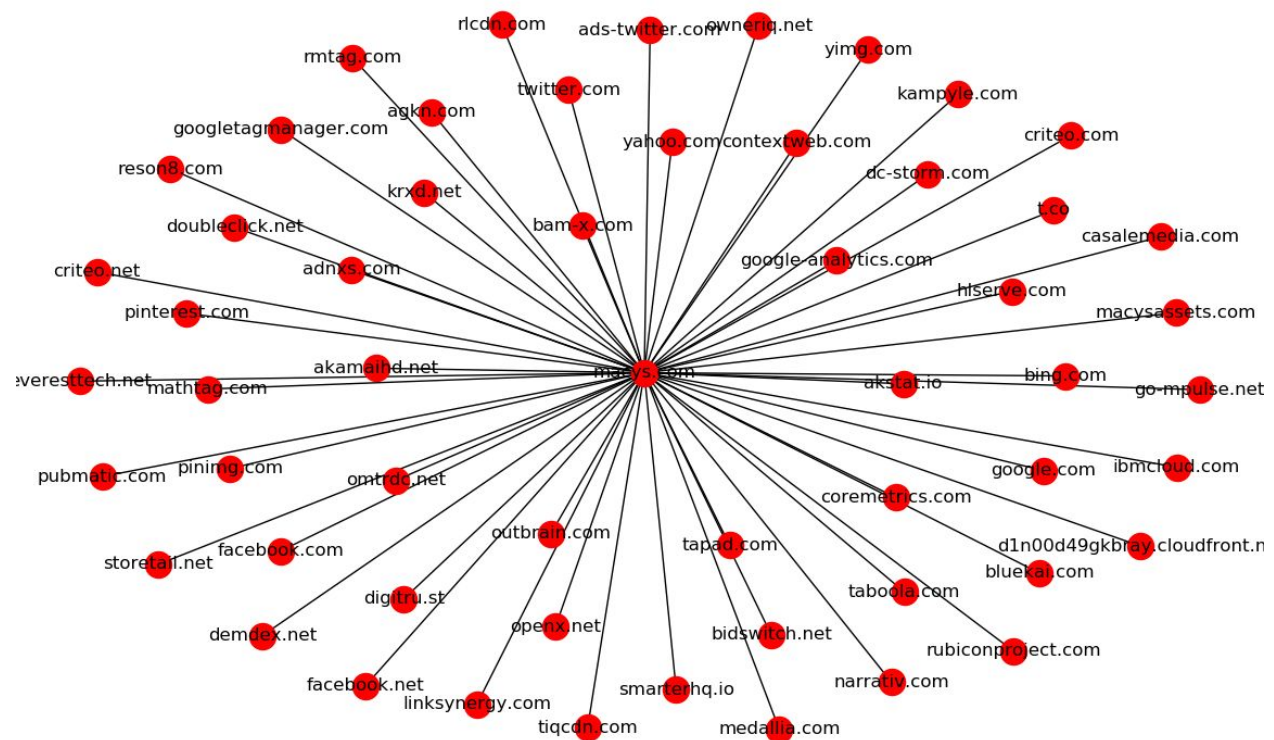
Question 3)

Readme, code and .har files are provided.

The list of third party domains and graphs for all the three domains are:

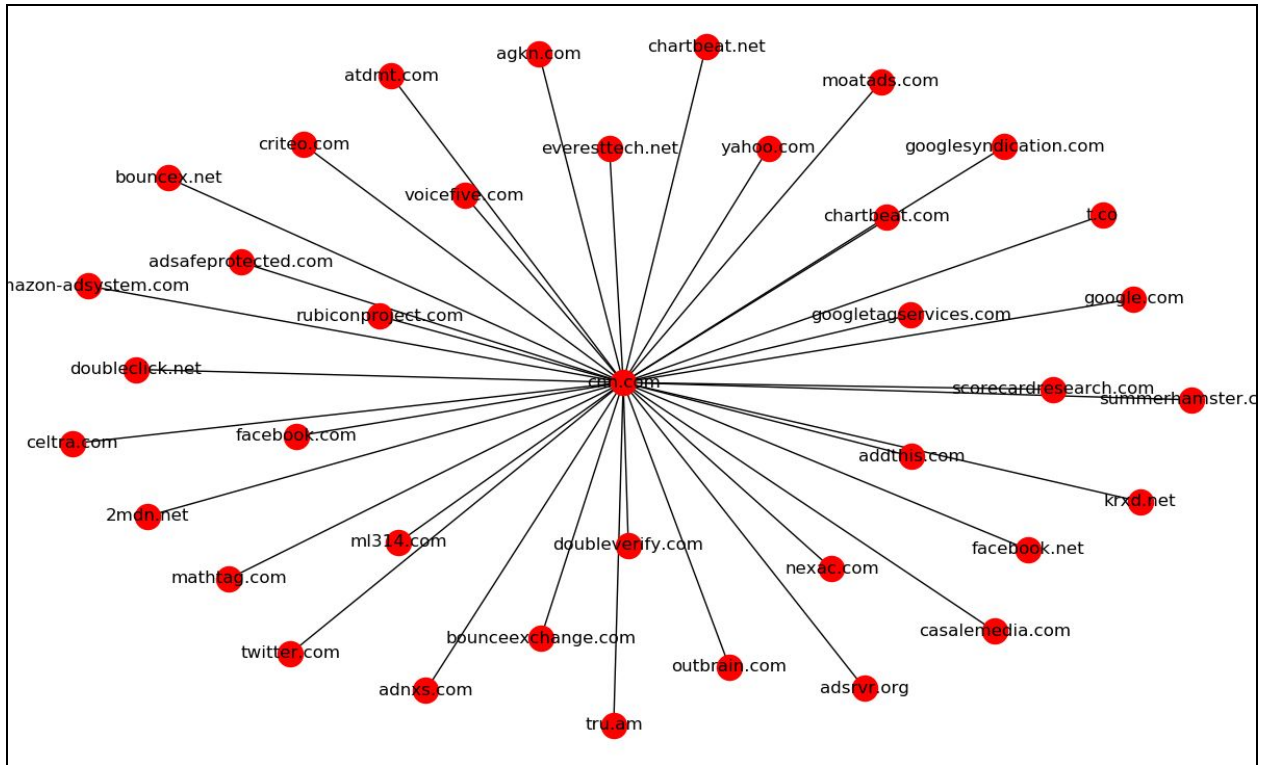
macys.com- Third Party Domains:

{'casalemedia.com', 'storetail.net', 'pinimg.com', 'criteo.net', 'rmtag.com', 'twitter.com', 'linksynergy.com', 'outbrain.com', 'dc-storm.com', 'tiqcdn.com', 'kampyle.com', 'tapad.com', 'pubmatic.com', 'openx.net', 'coremetrics.com', 'ibmcloud.com', 'bidswitch.net', 'macysassets.com', 'medallia.com', 'contextweb.com', 'ads-twitter.com', 'digitru.st', 'doubleclick.net', 'adnxs.com', 'agkn.com', 'rlcdn.com', 'bam-x.com', 'pinterest.com', 'bluekai.com', 'googletagmanager.com', 'yahoo.com', 'rubiconproject.com', 't.co', 'reson8.com', 'akamaihd.net', 'd1n00d49gkbray.cloudfront.net', 'taboola.com', 'bing.com', 'google-analytics.com', 'everesttech.net', 'facebook.com', 'omtrdc.net', 'go-mpulse.net', 'criteo.com', 'krxd.net', 'mathtag.com', 'google.com', 'narrativ.com', 'demdex.net', 'akstat.io', 'hlserve.com', 'smarterhq.io', 'yimg.com', 'facebook.net', 'owneriq.net')}



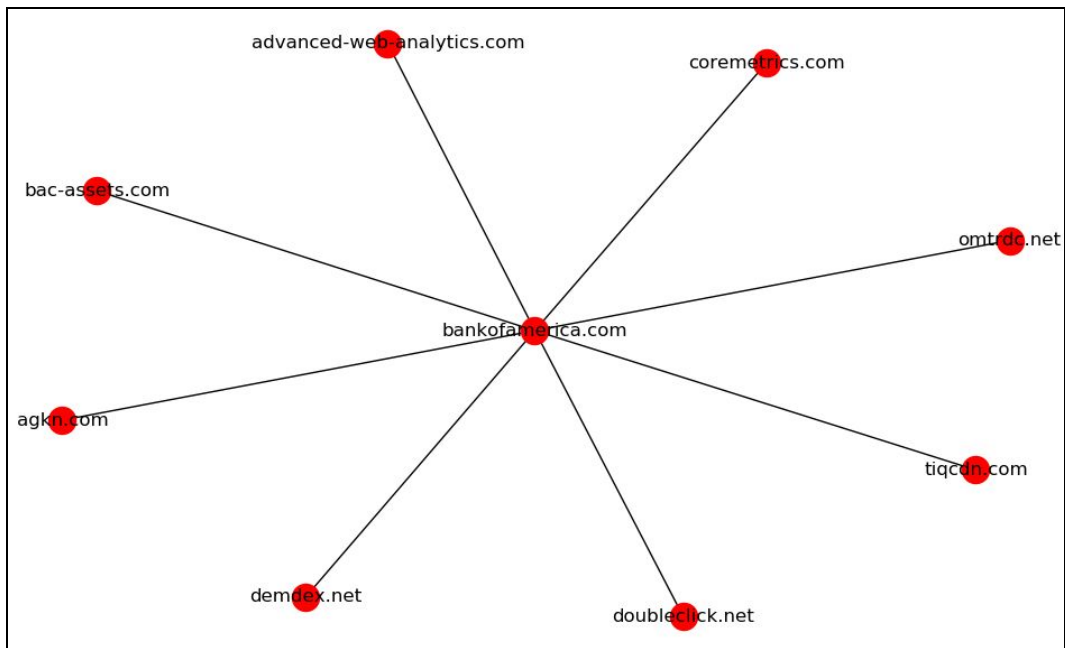
cnn.com- Third Party Domains:

{'addthis.com', 'casalemedia.com', 'ml314.com', 'scorecardresearch.com', 'twitter.com', 'outbrain.com', 'celtra.com', 'nexac.com', 'bounceexchange.com', 'amazon-adsystem.com', 'summerhamster.com', 'adsafeprotected.com', 'doubleclick.net', 'adnxs.com', 'tru.am', 'agkn.com', 'chartbeat.net', 'googlesyndication.com', 'googletagservices.com', 'chartbeat.com', 'doubleverify.com', 'voicefive.com', 'rubiconproject.com', 'yahoo.com', 't.co', 'bouncex.net', 'everesttech.net', 'facebook.com', 'atdmt.com', '2mdn.net', 'criteo.com', 'krxd.net', 'mathtag.com', 'google.com', 'facebook.net', 'adsvr.org', 'moatads.com'}



bankofamerica.com- Third Party Domains:

{'coremetrics.com', 'advanced-web-analytics.com', 'demdex.net', 'doubleclick.net', 'tiqcdn.com', 'bac-assets.com', 'agkn.com', 'omtrdc.net'}



Question 4)

Readme, code and .har files are provided

Site	# of total HTTP requests	# of HTTP requests blocked	Third-party domains blocked
macys.com	220	2	pubmatic.com
cnn.com	161	31	googlesyndication.com 2mdn.net doubleclick.net scorecardresearch.com google.com adsafeprotected.com
bankofamerica.com	123	0	-

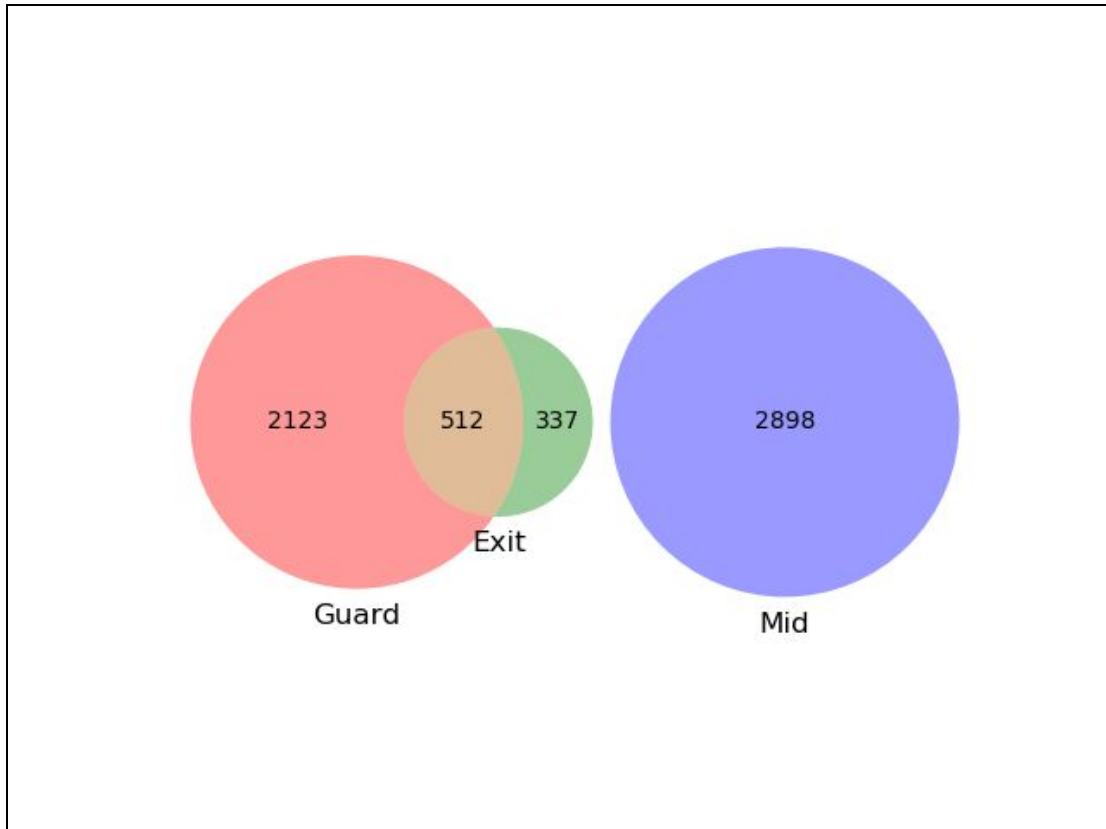
Question 5)

Readme, code and .har files are provided

- Top 5 countries hosting TOR relays- ['DE', 'US', 'FR', 'NL', 'CA']
- Top 5 bandwidth contributing relays-

Router Name	CC	Hostname	IP Address	Bandwidth
LittleFoxRahja	DE	rahja.lf-net.org	178.63.72.24	170000.0
Unnamed	FR	ns3082025.ip-145-239-66.eu	145.239.66.236	160000.0
5efd8dd	DE	5efd8dd.retik.eu	213.239.216.221	153000.0
Unnamed	FR	ns3127631.ip-54-38-92.eu	54.38.92.43	140000.0
Unnamed	FR	ns340204.ip-5-39-69.eu	5.39.69.166	131000.0

- Venn Diagram



Guard only- 2123

Mid- 2898

Exit only- 337

Cumulative Bandwidths-

Guard- 39983029

Mid- 6866388

Exit- 2700394