DAFTAR PUSTAKA

Abdullah, A.Y., 2022. Tips Design Pattern MVVM pada Pengembangan Aplikasi Android [WWW Document]. Dicoding Blog. URL https://www.dicoding.com/blog/tips-design-pattern-mvvm/ (accessed 7.26.22).

Alsaqqa, S., Sawalha, S., Abdel-Nabi, H., 2020. Agile Software Development: Methodologies and Trends. Int. J. Interact. Mob. Technol. IJIM 14, 246. https://doi.org/10.3991/ijim.v14i11.13269

Android Profiler | Developer Android [WWW Document], n.d. . Android Dev. URL https://developer.android.com/studio/profile/android-profiler?hl=id (accessed 10.30.22).

Annual number of mobile app downloads worldwide 2021 [WWW Document], n.d. . Statista. URL https://www.statista.com/statistics/271644/worldwide-free-and-paid-mobile-app-store-downloads/ (accessed 7.23.22).

Degu, A., n.d. Android Application Memory and Energy Performance: Systematic Literature Review 14.

Feng, R., Meng, G., Xie, X., Su, T., Liu, Y., Lin, S.-W., 2019. Learning Performance Optimization from Code Changes for Android Apps, in: 2019 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW). Presented at the 2019 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW), pp. 285–290. https://doi.org/10.1109/ICSTW.2019.00067

Interfaces | Memulai Pemrograman Dengan Kotlin | Dicoding Indonesia [WWW Document], n.d. URL https://www.dicoding.com/academies/80/tutorials/4346 (accessed 10.23.22).

Kaur, A., n.d. Comparative Analysis of Line of Code Metric Tools.

Lachgar, M., Benouda, H., Elfirdoussi, S., 2018. Android REST APIs: Volley vs Retrofit, in: 2018 International Symposium on Advanced Electrical and Communication Technologies (ISAECT). Presented at the 2018 International Symposium on Advanced Electrical and Communication Technologies (ISAECT), IEEE, Rabat, Morocco, pp. 1–6. https://doi.org/10.1109/ISAECT.2018.8618824

Lines of Code (LOC) in Software Engineering, 2021. . GeeksforGeeks. URL https://www.geeksforgeeks.org/lines-of-code-loc-in-software-engineering/ (accessed 12.1.22).

Martinez, M., Gois Mateus, B., 2021. Why did developers migrate Android Applications from Java to Kotlin? IEEE Trans. Softw. Eng. 1–1. https://doi.org/10.1109/TSE.2021.3120367

Mengenal Android Studio | Developer Android [WWW Document], n.d. . Android Dev. URL https://developer.android.com/studio/intro?hl=id (accessed 7.23.22).

Perbandingan Kinerja Pola Perancangan MVC, MVP, dan MVVM Pada Aplikasi Berbasis Android (Studi kasus : Aplikasi Laporan Hasil Belajar Siswa SMA BSS) | Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer [WWW Document], n.d. URL https://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/8237 (accessed 7.26.22).

Platform Architecture [WWW Document], n.d. . Android Dev. URL https://developer.android.com/guide/platform (accessed 10.24.22).

Putra, S.A., 2020. Android MVVM — Part 1 Pengenalan MVVM. UNIKOM Codelabs. URL https://medium.com/codelabs-unikom/android-mvvm-part-1-pengenalan-mvvm-ebeeb397b427 (accessed 7.29.22).

Sibarani, N., Munawar, G., Wisnuadhi, B., 2018. Analisis Performa Aplikasi Android Pada Bahasa Pemrograman Java dan Kotlin.

Simple GET request using Retrofit in Android [WWW Document], n.d. . Eng. Educ. EngEd Program Sect. URL https://www.section.io/engineering-education/making-api-requests-using-retrofit-android/ (accessed 7.29.22).

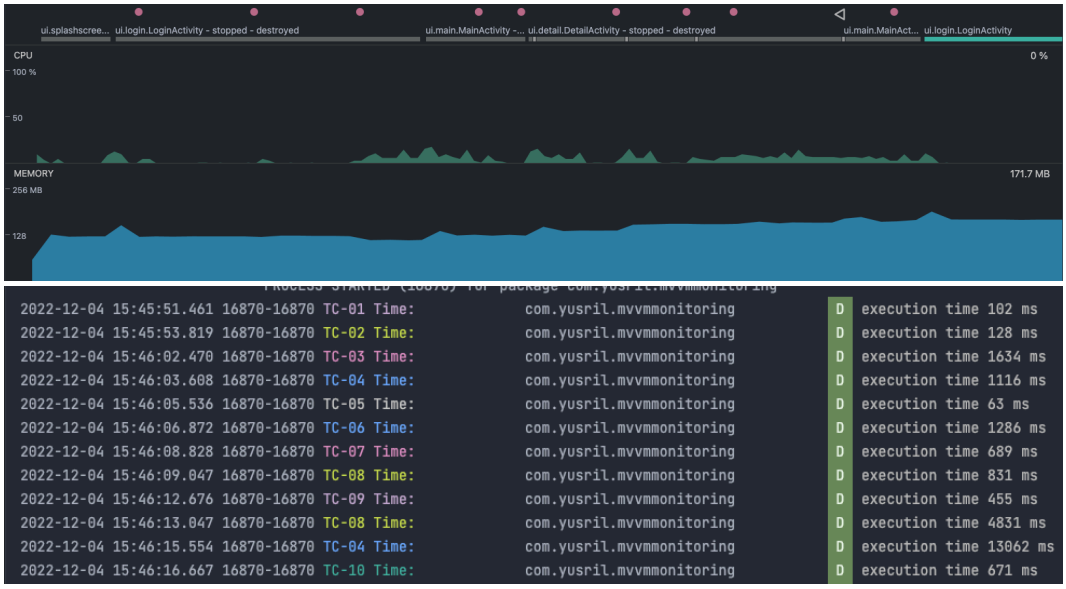
Teori Architectural Pattern | Menjadi Android Developer Expert | Dicoding Indonesia [WWW Document], n.d. URL https://www.dicoding.com/academies/165/tutorials/10284 (accessed 7.23.22).

Wisnuadhi, B., Munawar, G., Wahyu, U., 2020. Performance Comparison of Native Android Application on MVP and MVVM. https://doi.org/10.2991/aer.k.201221.047

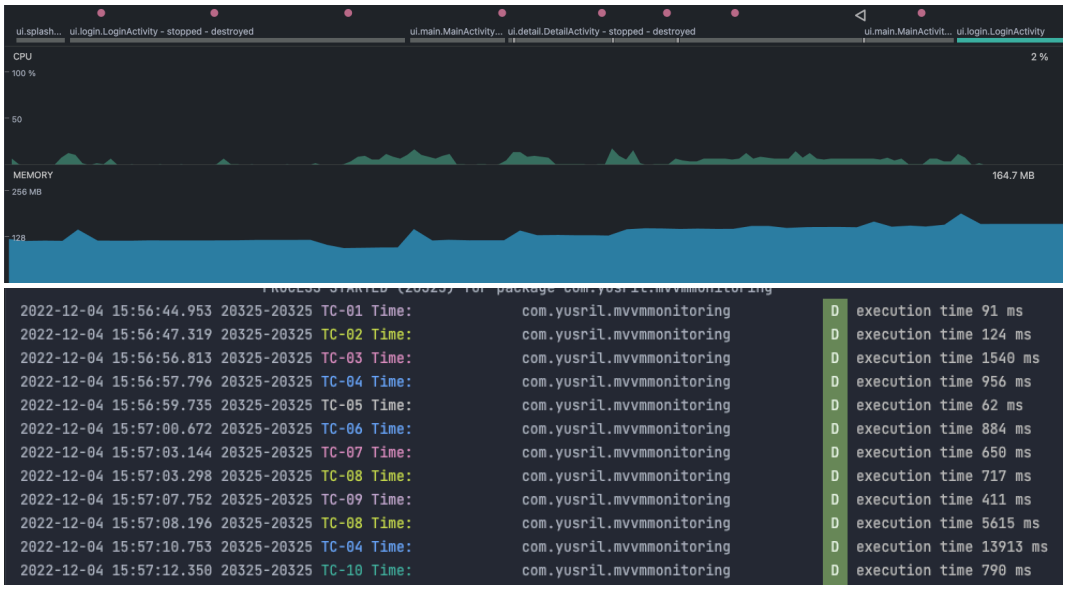
Lampiran 1 *Screenshot* pengukuran performa setiap *test case*

Arsitektur MVVM

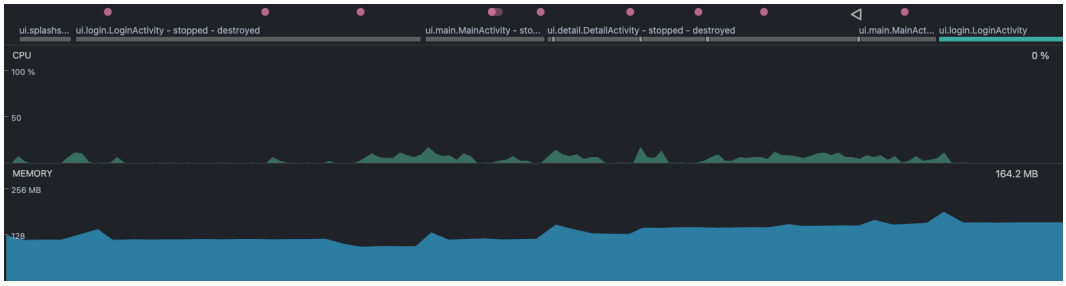
Percobaan 1:



Percobaan 2:

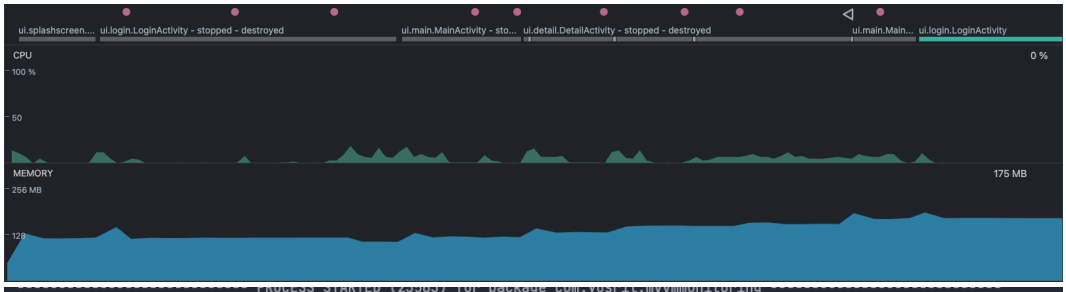


Percobaan 3:



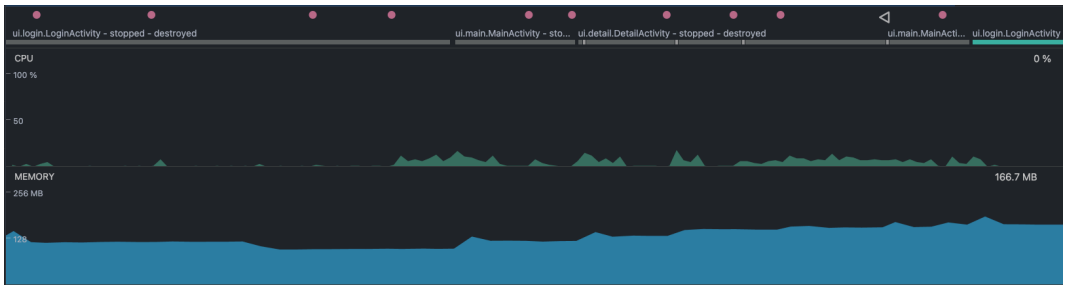

```
2022-12-04 16:02:46.243 22430-22430 TC-01 Time:          com.yusril.mvvmmonitoring    D  execution time 99 ms
2022-12-04 16:02:48.578 22430-22430 TC-02 Time:          com.yusril.mvvmmonitoring    D  execution time 123 ms
2022-12-04 16:02:58.326 22430-22430 TC-03 Time:          com.yusril.mvvmmonitoring    D  execution time 1645 ms
2022-12-04 16:02:59.436 22430-22430 TC-04 Time:          com.yusril.mvvmmonitoring    D  execution time 1087 ms
2022-12-04 16:03:01.927 22430-22430 TC-05 Time:          com.yusril.mvvmmonitoring    D  execution time 63 ms
2022-12-04 16:03:03.130 22430-22430 TC-06 Time:          com.yusril.mvvmmonitoring    D  execution time 1152 ms
2022-12-04 16:03:05.009 22430-22430 TC-07 Time:          com.yusril.mvvmmonitoring    D  execution time 640 ms
2022-12-04 16:03:06.616 22430-22430 TC-08 Time:          com.yusril.mvvmmonitoring    D  execution time 2170 ms
2022-12-04 16:03:09.596 22430-22430 TC-09 Time:          com.yusril.mvvmmonitoring    D  execution time 482 ms
2022-12-04 16:03:09.938 22430-22430 TC-08 Time:          com.yusril.mvvmmonitoring    D  execution time 5492 ms
2022-12-04 16:03:11.646 22430-22430 TC-04 Time:          com.yusril.mvvmmonitoring    D  execution time 13297 ms
2022-12-04 16:03:12.911 22430-22430 TC-10 Time:          com.yusril.mvvmmonitoring    D  execution time 771 ms
```

Percobaan 4:




```
2022-12-04 16:08:48.304 23563-23563 TC-01 Time:          com.yusril.mvvmmonitoring    D  execution time 120 ms
2022-12-04 16:08:50.631 23563-23563 TC-02 Time:          com.yusril.mvvmmonitoring    D  execution time 121 ms
2022-12-04 16:08:59.027 23563-23563 TC-03 Time:          com.yusril.mvvmmonitoring    D  execution time 1681 ms
2022-12-04 16:09:00.110 23563-23563 TC-04 Time:          com.yusril.mvvmmonitoring    D  execution time 1058 ms
2022-12-04 16:09:02.640 23563-23563 TC-05 Time:          com.yusril.mvvmmonitoring    D  execution time 60 ms
2022-12-04 16:09:03.588 23563-23563 TC-06 Time:          com.yusril.mvvmmonitoring    D  execution time 894 ms
2022-12-04 16:09:05.809 23563-23563 TC-07 Time:          com.yusril.mvvmmonitoring    D  execution time 785 ms
2022-12-04 16:09:06.869 23563-23563 TC-08 Time:          com.yusril.mvvmmonitoring    D  execution time 966 ms
2022-12-04 16:09:10.106 23563-23563 TC-09 Time:          com.yusril.mvvmmonitoring    D  execution time 438 ms
2022-12-04 16:09:10.515 23563-23563 TC-08 Time:          com.yusril.mvvmmonitoring    D  execution time 5412 ms
2022-12-04 16:09:13.865 23563-23563 TC-04 Time:          com.yusril.mvvmmonitoring    D  execution time 14013 ms
2022-12-04 16:09:13.748 23563-23563 TC-10 Time:          com.yusril.mvvmmonitoring    D  execution time 940 ms
```

Percobaan 5:



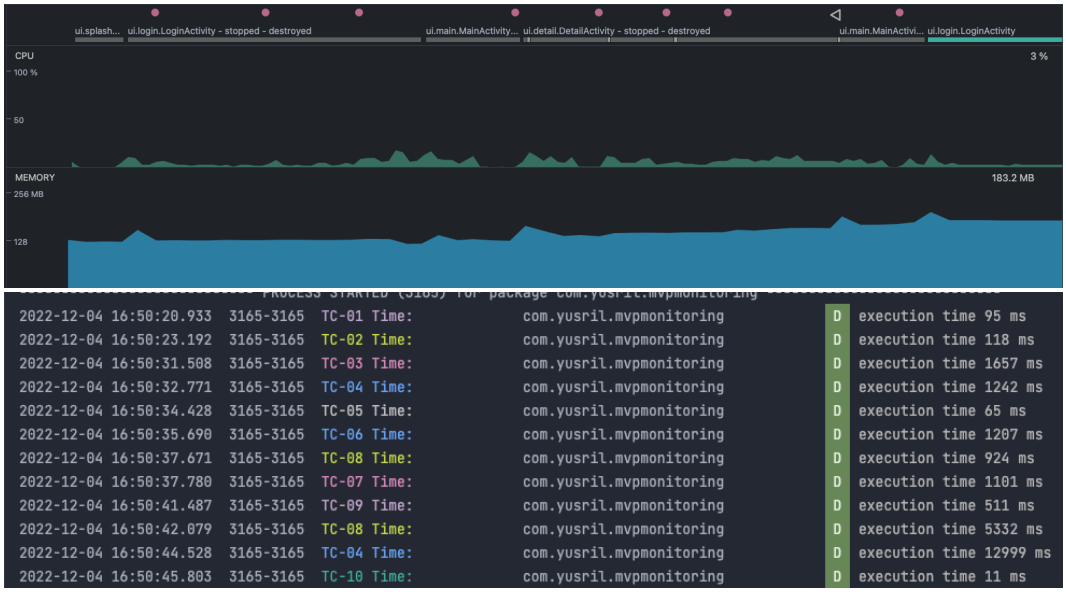

```
2022-12-04 16:16:15.395 25792-25792 TC-01 Time:          com.yusril.mvvmmonitoring          D  execution time 91 ms
2022-12-04 16:16:17.730 25792-25792 TC-02 Time:          com.yusril.mvvmmonitoring          D  execution time 119 ms
2022-12-04 16:16:30.446 25792-25792 TC-03 Time:          com.yusril.mvvmmonitoring          D  execution time 1562 ms
2022-12-04 16:16:31.510 25792-25792 TC-04 Time:          com.yusril.mvvmmonitoring          D  execution time 1040 ms
2022-12-04 16:16:34.074 25792-25792 TC-05 Time:          com.yusril.mvvmmonitoring          D  execution time 67 ms
2022-12-04 16:16:35.119 25792-25792 TC-06 Time:          com.yusril.mvvmmonitoring          D  execution time 995 ms
2022-12-04 16:16:37.277 25792-25792 TC-07 Time:          com.yusril.mvvmmonitoring          D  execution time 600 ms
2022-12-04 16:16:37.466 25792-25792 TC-08 Time:          com.yusril.mvvmmonitoring          D  execution time 712 ms
2022-12-04 16:16:41.129 25792-25792 TC-09 Time:          com.yusril.mvvmmonitoring          D  execution time 493 ms
2022-12-04 16:16:41.607 25792-25792 TC-08 Time:          com.yusril.mvvmmonitoring          D  execution time 4853 ms
2022-12-04 16:16:43.970 25792-25792 TC-04 Time:          com.yusril.mvvmmonitoring          D  execution time 13500 ms
2022-12-04 16:16:45.131 25792-25792 TC-10 Time:          com.yusril.mvvmmonitoring          D  execution time 656 ms
```

Waktu eksekusi pada *test case* TC-10:

```
--------------------------- PROCESS STARTED (12439) for package com.yusril.mvvmmonitoring ---------------------------
2022-12-04 17:23:57.043 12439-12439 TC-10 Time:          com.yusril.mvvmmonitoring          D  execution time 11 ms
--------------------------- PROCESS ENDED (12439) for package com.yusril.mvvmmonitoring ---------------------------
--------------------------- PROCESS STARTED (12680) for package com.yusril.mvvmmonitoring ---------------------------
2022-12-04 17:24:18.977 12680-12680 TC-10 Time:          com.yusril.mvvmmonitoring          D  execution time 11 ms
--------------------------- PROCESS ENDED (12680) for package com.yusril.mvvmmonitoring ---------------------------
--------------------------- PROCESS STARTED (12888) for package com.yusril.mvvmmonitoring ---------------------------
2022-12-04 17:24:43.390 12888-12888 TC-10 Time:          com.yusril.mvvmmonitoring          D  execution time 11 ms
--------------------------- PROCESS ENDED (12888) for package com.yusril.mvvmmonitoring ---------------------------
--------------------------- PROCESS STARTED (13010) for package com.yusril.mvvmmonitoring ---------------------------
2022-12-04 17:25:04.210 13010-13010 TC-10 Time:          com.yusril.mvvmmonitoring          D  execution time 11 ms
--------------------------- PROCESS ENDED (13010) for package com.yusril.mvvmmonitoring ---------------------------
--------------------------- PROCESS STARTED (13126) for package com.yusril.mvvmmonitoring ---------------------------
2022-12-04 17:25:22.942 13126-13126 TC-10 Time:          com.yusril.mvvmmonitoring          D  execution time 12 ms
```

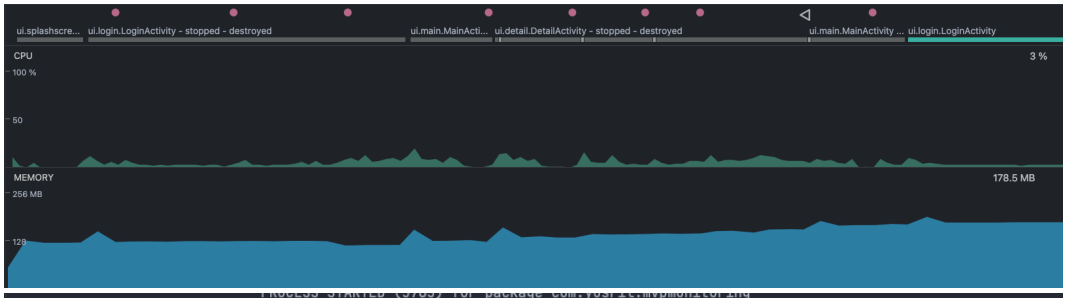
Arsitektur MVP

Percobaan 1 :




```
2022-12-04 16:50:20.933  3165-3165  TC-01 Time:              com.yusril.mvpmonitoring         D  execution time 95 ms
2022-12-04 16:50:23.192  3165-3165  TC-02 Time:              com.yusril.mvpmonitoring         D  execution time 118 ms
2022-12-04 16:50:31.508  3165-3165  TC-03 Time:              com.yusril.mvpmonitoring         D  execution time 1657 ms
2022-12-04 16:50:32.771  3165-3165  TC-04 Time:              com.yusril.mvpmonitoring         D  execution time 1242 ms
2022-12-04 16:50:34.428  3165-3165  TC-05 Time:              com.yusril.mvpmonitoring         D  execution time 65 ms
2022-12-04 16:50:35.690  3165-3165  TC-06 Time:              com.yusril.mvpmonitoring         D  execution time 1207 ms
2022-12-04 16:50:37.671  3165-3165  TC-08 Time:              com.yusril.mvpmonitoring         D  execution time 924 ms
2022-12-04 16:50:37.780  3165-3165  TC-07 Time:              com.yusril.mvpmonitoring         D  execution time 1101 ms
2022-12-04 16:50:41.487  3165-3165  TC-09 Time:              com.yusril.mvpmonitoring         D  execution time 511 ms
2022-12-04 16:50:42.079  3165-3165  TC-08 Time:              com.yusril.mvpmonitoring         D  execution time 5332 ms
2022-12-04 16:50:44.528  3165-3165  TC-04 Time:              com.yusril.mvpmonitoring         D  execution time 12999 ms
2022-12-04 16:50:45.803  3165-3165  TC-10 Time:              com.yusril.mvpmonitoring         D  execution time 11 ms
```

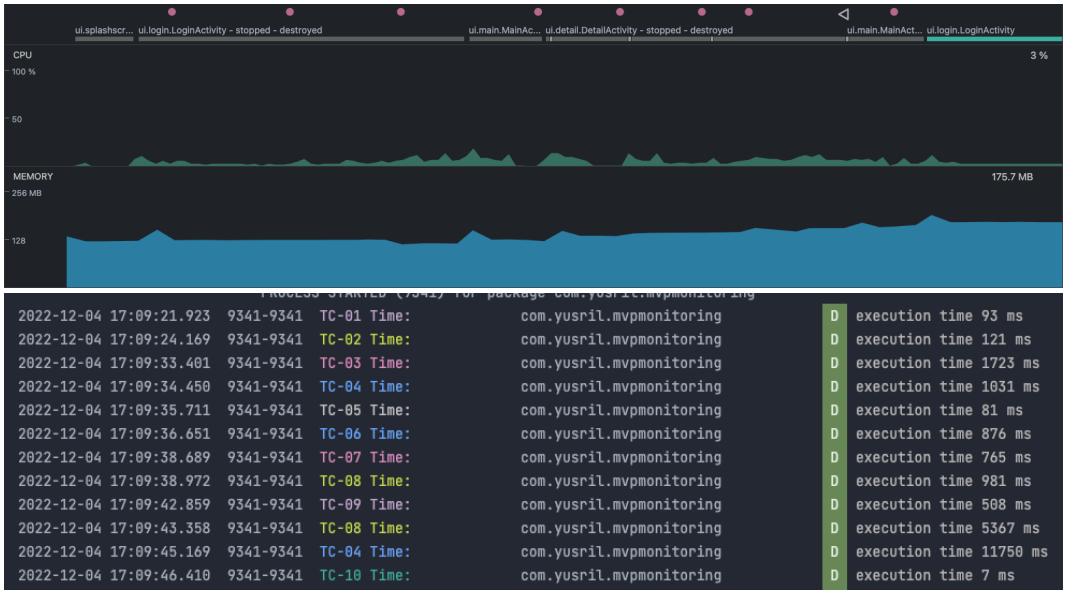
Percobaan 2:



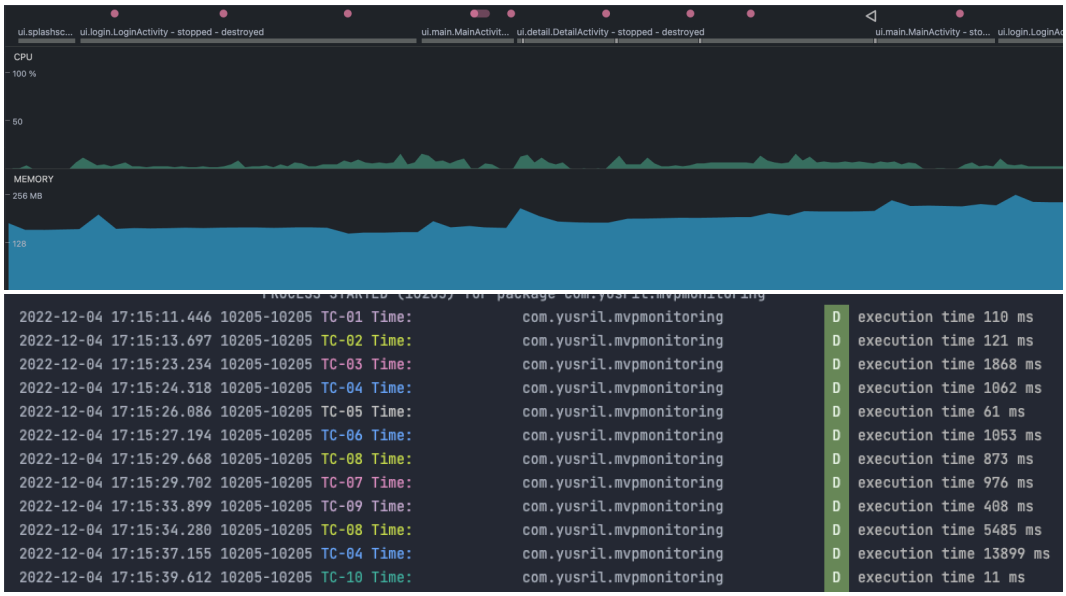

```
2022-12-04 16:57:38.167  5765-5765  TC-01 Time:              com.yusril.mvpmonitoring         D  execution time 114 ms
2022-12-04 16:57:40.430  5765-5765  TC-02 Time:              com.yusril.mvpmonitoring         D  execution time 129 ms
2022-12-04 16:57:49.422  5765-5765  TC-03 Time:              com.yusril.mvpmonitoring         D  execution time 1556 ms
2022-12-04 16:57:50.596  5765-5765  TC-04 Time:              com.yusril.mvpmonitoring         D  execution time 1148 ms
2022-12-04 16:57:51.969  5765-5765  TC-05 Time:              com.yusril.mvpmonitoring         D  execution time 61 ms
2022-12-04 16:57:53.011  5765-5765  TC-06 Time:              com.yusril.mvpmonitoring         D  execution time 989 ms
2022-12-04 16:57:55.150  5765-5765  TC-08 Time:              com.yusril.mvpmonitoring         D  execution time 801 ms
2022-12-04 16:57:55.197  5765-5765  TC-07 Time:              com.yusril.mvpmonitoring         D  execution time 917 ms
2022-12-04 16:57:59.302  5765-5765  TC-09 Time:              com.yusril.mvpmonitoring         D  execution time 507 ms
2022-12-04 16:57:59.704  5765-5765  TC-08 Time:              com.yusril.mvpmonitoring         D  execution time 5355 ms
2022-12-04 16:58:01.928  5765-5765  TC-04 Time:              com.yusril.mvpmonitoring         D  execution time 12480 ms
2022-12-04 16:58:03.572  5765-5765  TC-10 Time:              com.yusril.mvpmonitoring         D  execution time 11 ms
```

Percobaan 3:

Percobaan 4:



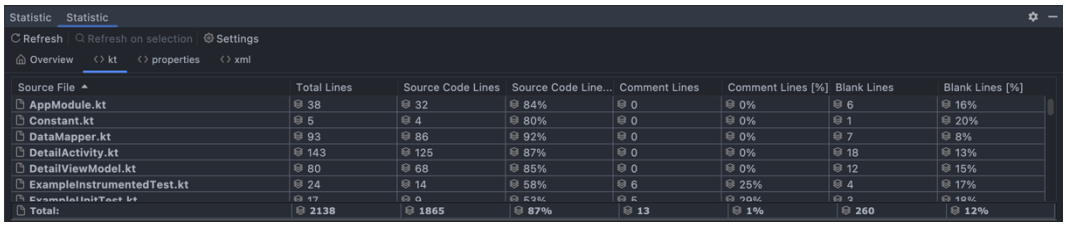
Percobaan 5:




```
2022-12-04 17:15:11.446 10205-10205 TC-01 Time:          com.yusril.mvpmonitoring    D  execution time 110 ms
2022-12-04 17:15:13.697 10205-10205 TC-02 Time:          com.yusril.mvpmonitoring    D  execution time 121 ms
2022-12-04 17:15:23.234 10205-10205 TC-03 Time:          com.yusril.mvpmonitoring    D  execution time 1868 ms
2022-12-04 17:15:24.318 10205-10205 TC-04 Time:          com.yusril.mvpmonitoring    D  execution time 1062 ms
2022-12-04 17:15:26.086 10205-10205 TC-05 Time:          com.yusril.mvpmonitoring    D  execution time 61 ms
2022-12-04 17:15:27.194 10205-10205 TC-06 Time:          com.yusril.mvpmonitoring    D  execution time 1053 ms
2022-12-04 17:15:29.668 10205-10205 TC-08 Time:          com.yusril.mvpmonitoring    D  execution time 873 ms
2022-12-04 17:15:29.702 10205-10205 TC-07 Time:          com.yusril.mvpmonitoring    D  execution time 976 ms
2022-12-04 17:15:33.899 10205-10205 TC-09 Time:          com.yusril.mvpmonitoring    D  execution time 408 ms
2022-12-04 17:15:34.280 10205-10205 TC-08 Time:          com.yusril.mvpmonitoring    D  execution time 5485 ms
2022-12-04 17:15:37.155 10205-10205 TC-04 Time:          com.yusril.mvpmonitoring    D  execution time 13899 ms
2022-12-04 17:15:39.612 10205-10205 TC-10 Time:          com.yusril.mvpmonitoring    D  execution time 11 ms
```

Lampiran 2 *Screenshot* perhitungan jumlah baris kode

Arsitektur MVVM


Statistic Statistic

Refresh | Refresh on selection | Settings

Overview | kt | properties | xml

Source File	Total Lines	Source Code Lines	Source Code Line...	Comment Lines	Comment Lines [%]	Blank Lines	Blank Lines [%]
AppModule.kt	38	32	84%	0	0%	6	16%
Constant.kt	5	4	80%	0	0%	1	20%
DataMapper.kt	93	86	92%	0	0%	7	8%
DetailActivity.kt	143	125	87%	0	0%	18	13%
DetailViewModel.kt	80	68	85%	0	0%	12	15%
ExampleInstrumentedTest.kt	24	14	58%	6	25%	4	17%
Total:	2138	1865	87%	13	1%	260	12%


Statistic Statistic

Refresh | Refresh on selection | Settings

Overview | kt | properties | xml

Source File	Total Lines	Source Code Lines	Source Code Lines [%]	Comment Lines	Comment Lines [%]	Blank Lines	Blank Lines [%]
gradle.properties	23	4	17%	19	83%	0	0%
gradle-wrapper.properties	6	5	83%	1	17%	0	0%
local.properties	9	2	22%	7	78%	0	0%
Total:	38	11	29%	27	71%	0	0%


Statistic Statistic

Refresh | Refresh on selection | Settings

Overview | kt | properties | xml

Source File	Total Lines	Source Code Lines	Source Code Lines [%]	Comment Lines	Comment Lines [%]	Blank Lines	Blank Lines [%]
main_header.xml	53	45	85%	0	0%	8	15%
main_menu.xml	8	8	100%	0	0%	0	0%
placeholder_item_row_student.xml	57	50	88%	0	0%	7	12%
placeholder_item_row_subject.xml	67	59	88%	0	0%	8	12%
semester_list_item.xml	10	10	100%	0	0%	0	0%
strings.xml	32	27	84%	1	3%	4	12%
student_list.xml	90	79	88%	0	0%	11	12%
themes.xml	37	26	70%	9	24%	2	5%
themes.xml	17	12	71%	5	29%	0	0%
view_empty.xml	26	23	88%	0	0%	3	12%
Total:	2003	1801	90%	29	1%	173	9%

Arsitektur MVP


Statistic Statistic

Refresh | Refresh on selection | Settings

Overview | kt | properties | xml

Source File	Total Lines	Source Code Lines	Source Code Line...	Comment Lines	Comment Lines [%]	Blank Lines	Blank Lines [%]
AppModule.kt	54	44	81%	0	0%	10	19%
Constant.kt	5	4	80%	0	0%	1	20%
DataMapper.kt	93	86	92%	0	0%	7	8%
DetailActivity.kt	131	112	85%	0	0%	19	15%
DetailContract.kt	14	13	93%	0	0%	1	7%
DetailPresenter.kt	36	32	89%	0	0%	4	11%
ExampleInstrumentedTest.kt	24	14	58%	6	25%	4	17%
ExampleUnitTest.kt	17	9	53%	5	29%	3	18%
GetKHSResponse.kt	27	22	81%	0	0%	5	19%
Total:	2338	2033	87%	13	1%	292	12%


Statistic Statistic

Refresh | Refresh on selection | Settings

Overview | kt | properties | xml

Source File	Total Lines	Source Code Lines	Source Code Lines [%]	Comment Lines	Comment Lines [%]	Blank Lines	Blank Lines [%]
gradle.properties	23	4	17%	19	83%	0	0%
gradle-wrapper.properties	6	5	83%	1	17%	0	0%
local.properties	9	2	22%	7	78%	0	0%
Total:	38	11	29%	27	71%	0	0%


Statistic Statistic

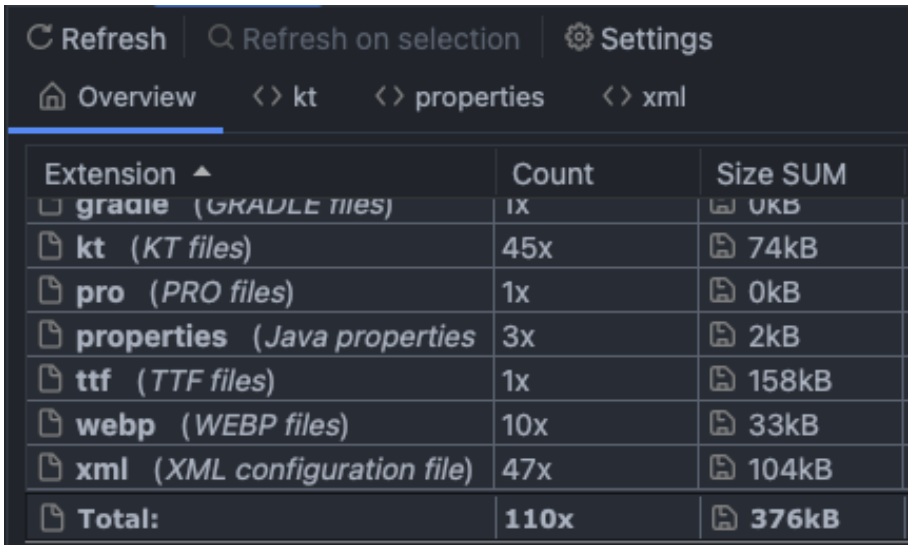
Refresh | Refresh on selection | Settings

Overview | kt | properties | xml

Source File	Total Lines	Source Code Lines	Source Code Lines [%]	Comment Lines	Comment Lines [%]	Blank Lines	Blank Lines [%]
placeholder_item_row_student.xml	57	50	88%	0	0%	7	12%
placeholder_item_row_subject.xml	67	59	88%	0	0%	8	12%
semester_list_item.xml	10	10	100%	0	0%	0	0%
strings.xml	32	27	84%	1	3%	4	12%
student_list.xml	90	79	88%	0	0%	11	12%
themes.xml	37	26	70%	9	24%	2	5%
themes.xml	17	12	71%	5	29%	0	0%
view_empty.xml	26	23	88%	0	0%	3	12%
Total:	2003	1801	90%	29	1%	173	9%

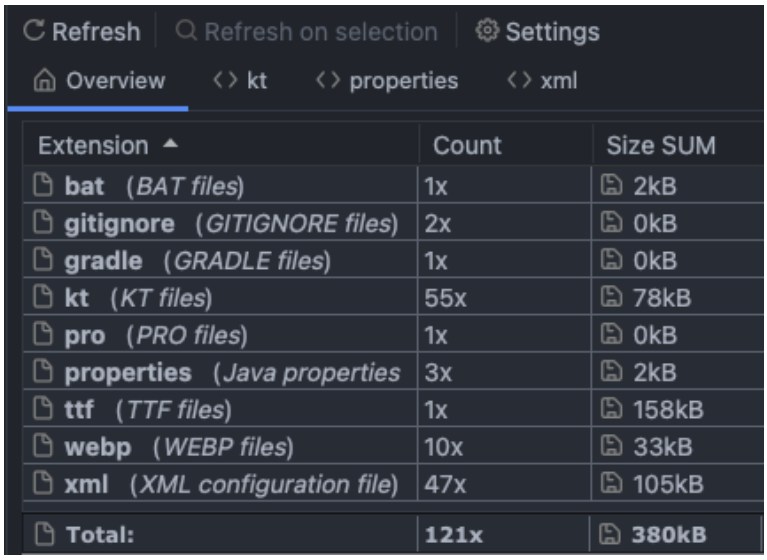
Lampiran 3 *Screenshot* perhitungan ukuran baris kode

Arsitektur MVVM



Extension	Count	Size SUM
gradle (GRADLE files)	1x	0kB
kt (KT files)	45x	74kB
pro (PRO files)	1x	0kB
properties (Java properties	3x	2kB
ttf (TTF files)	1x	158kB
webp (WEBP files)	10x	33kB
xml (XML configuration file)	47x	104kB
Total:	**110x**	**376kB**

Arsitektur MVP



Extension	Count	Size SUM
bat (BAT files)	1x	2kB
gitignore (GITIGNORE files)	2x	0kB
gradle (GRADLE files)	1x	0kB
kt (KT files)	55x	78kB
pro (PRO files)	1x	0kB
properties (Java properties	3x	2kB
ttf (TTF files)	1x	158kB
webp (WEBP files)	10x	33kB
xml (XML configuration file)	47x	105kB
Total:	**121x**	**380kB**

Lampiran 4 Daftar perbaikan

DAFTAR PERBAIKAN

Yusril – D121171007

Analisis Performa Arsitektur MVVM Dan MVP pada Aplikasi Android Menggunakan Fitur *Networking* (Studi Kasus: Aplikasi *Monitoring* Mahasiswa)

Memindahkan pembahasan ke bawah grafik	BAB IV Halaman 39-47
Perbaikan analisis penggunaan CPU	BAB IV Halaman 39-41
Perbaikan analisis penggunaan memori	BAB IV Halaman 42-44
Memasukkan *library viewmodel* ke dalam perhitungan ukuran dan baris kode	BAB IV Halaman 46-47

Lampiran 5 Lembar perbaikan skripsi

LEMBAR PERBAIKAN SKRIPSI

"ANALISIS PERFORMA ARSITEKTUR MVVM DAN MVP PADA APLIKASI ANDROID MENGGUNAKAN FITUR *NETWORKING* (STUDI KASUS: APLIKASI *MONITORING* MAHASISWA)"

OLEH:

YUSRIL
D121171007

Skripsi ini telah dipertahankan pada Ujian Akhir Sarjana tanggal 10 Maret 2023.

Telah dilakukan perbaikan penulisan dan isi skripsi berdasarkan usulan dari penguji dan pembimbing skripsi.

Persetujuan perbaikan oleh tim penguji:

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Sekretaris	A. Ais Prayogi Alimuddin, S.T., M.Eng	
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Persetujuan Perbaikan oleh pembimbing:

Pembimbing	Nama	Tanda Tangan
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