

# Studi Kasus 6

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## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
library(Biobase)

## Loading required package: BiocGenerics

##
## Attaching package: 'BiocGenerics'

## The following objects are masked from 'package:stats':
##       IQR, mad, sd, var, xtabs

## The following objects are masked from 'package:base':
##       anyDuplicated, aperm, append, as.data.frame, basename, cbind,
##       colnames, dirname, do.call, duplicated, eval, evalq, Filter, Find,
##       get, grep, grepl, intersect, is.unsorted, lapply, Map, mapply,
##       match, mget, order, paste, pmax, pmax.int, pmin, pmin.int,
##       Position, rank, rbind, Reduce, rownames, sapply, setdiff, sort,
##       table, tapply, union, unique, unsplit, which.max, which.min

## Welcome to Bioconductor
##
## Vignettes contain introductory material; view with
##   'browseVignettes()'. To cite Bioconductor, see
##   'citation("Biobase")', and for packages 'citation("pkgname")'.
```

```
library(dendextend)

##
## -----
## Welcome to dendextend version 1.17.1
## Type citation('dendextend') for how to cite the package.
```

```

## 
## Type browseVignettes(package = 'dendextend') for the package vignette.
## The github page is: https://github.com/talgalili/dendextend/
## 
## Suggestions and bug-reports can be submitted at: https://github.com/talgalili/dendextend/issues
## You may ask questions at stackoverflow, use the r and dendextend tags:
##   https://stackoverflow.com/questions/tagged/dendextend
## 
## To suppress this message use: suppressPackageStartupMessages(library(dendextend))
## -----
## 
## Attaching package: 'dendextend'

## The following object is masked from 'package:stats':
## 
##     cutree

```

## Loading data

```

## [1] "con"          "edata"        "fdata"        "montpick.eset"
## [5] "pdata"

```

## Clustering-1

```

#Cek distribusi data
dist1 = dist(t(edata))
dist1

```

	NA06985	NA06986	NA06994	NA07000	NA07037	NA07051
## NA06986	15657.624					
## NA06994	15974.269	13463.514				
## NA07000	23094.820	22662.098	17383.704			
## NA07037	21051.182	17488.885	16641.466	15560.537		
## NA07051	21542.207	14937.858	16023.215	25848.918	18227.592	
## NA07346	25043.262	23257.203	15625.463	13460.303	18662.736	26014.699
## NA07347	21485.858	20096.254	14445.171	12295.204	14409.488	22441.801
## NA07357	24357.376	28756.459	26281.665	35037.512	33475.867	29952.050
## NA10847	23371.501	26005.950	19344.754	21675.785	23268.073	28670.637
## NA10851	22855.754	26171.217	22325.343	26190.020	26714.919	29710.573
## NA11829	17689.368	17723.582	19331.117	27790.205	23082.698	19354.709
## NA11830	15968.621	15481.976	14987.394	24048.355	19184.691	14718.727
## NA11831	40117.267	38252.308	39408.006	46074.692	45627.864	36111.595
## NA11832	40131.980	38805.530	45188.425	49319.041	44015.608	38231.455
## NA11840	39536.402	41709.416	48405.740	53271.860	47378.659	44212.501
## NA11881	19880.263	21673.326	14499.567	15252.862	19563.578	24689.597
## NA11894	34484.295	33641.842	36382.858	38735.905	36674.708	36652.498
## NA11918	40200.342	40125.001	30862.777	26165.915	34786.526	40749.404
## NA11920	47600.862	46533.803	53058.166	59212.086	52516.335	49122.494
## NA11931	47778.283	46731.245	53694.915	58969.125	53627.630	47987.173

## NA11992	53922.893	57776.371	61191.589	67929.375	65115.039	60594.675
## NA11993	32857.310	38939.449	38474.716	43900.438	42879.097	42814.149
## NA11994	24210.020	26277.906	30242.353	35003.776	31506.916	29151.721
## NA11995	25179.622	25060.295	29475.337	36339.891	32932.756	27527.506
## NA12003	32334.622	33183.405	36625.762	48054.051	42474.266	33670.981
## NA12004	34020.971	32588.328	22555.013	21481.733	28201.817	32701.249
## NA12005	30525.152	28788.280	34693.592	42490.311	38051.562	31397.019
## NA12006	52529.238	53373.066	57227.050	61291.340	60363.106	56880.344
## NA12043	36296.711	35855.476	42416.857	47412.530	41578.129	36896.619
## NA12044	38127.773	42007.292	47976.052	54395.917	50104.545	45739.251
## NA12045	65628.658	68917.362	69403.012	69574.565	71579.475	71792.245
## NA12144	19636.087	17977.710	9107.876	15846.618	19157.785	19338.838
## NA12154	49051.422	49821.241	54197.815	61106.040	58121.731	51325.993
## NA12155	21115.518	24414.534	28223.204	31175.677	28362.051	28249.035
## NA12156	15850.468	13963.861	11770.734	20775.285	18885.390	13551.378
## NA12234	27721.170	25467.854	27737.594	35374.441	32958.864	24688.793
## NA12249	29879.862	28410.322	33009.402	40349.852	37675.584	29953.919
## NA12287	32870.672	29958.532	37749.274	44550.768	34148.119	28910.061
## NA12414	33391.780	30445.652	35181.491	38165.650	32441.506	29066.421
## NA12489	35108.518	37464.277	36343.204	40140.948	40413.380	41906.639
## NA12716	34295.294	38648.536	38042.570	43994.101	45327.837	42206.527
## NA12717	27902.195	31561.827	27534.094	34461.065	34982.636	35026.579
## NA12750	25747.605	26249.006	19444.019	22818.124	28758.389	26617.114
## NA12751	19844.551	19200.163	17645.391	16460.828	20997.219	22668.876
## NA12760	31588.619	31740.390	37392.970	43873.659	38740.867	33540.716
## NA12761	22012.109	24875.537	25018.055	26035.122	26369.224	28963.337
## NA12762	28824.059	27238.395	18790.720	14279.621	22127.034	28740.765
## NA12763	16572.867	16081.188	14198.037	20979.268	21896.429	19399.765
## NA12776	42849.357	39356.534	46852.221	52274.742	44916.982	39395.862
## NA12812	38946.315	41044.812	46097.049	47373.343	43752.939	44560.909
## NA12813	29744.197	30983.863	23431.083	19363.542	28455.353	33503.680
## NA12814	41786.808	42709.469	45786.030	51039.665	49459.060	44661.882
## NA12815	22111.788	21904.271	23719.038	33865.709	30599.883	22338.644
## NA12828	30848.338	27680.761	34874.432	40420.224	34122.749	29774.794
## NA12872	32877.655	33701.743	37307.932	40789.781	37330.942	35711.449
## NA12873	57851.273	57109.391	62419.106	70932.080	66135.536	56216.691
## NA12874	58673.709	62773.451	58691.773	59706.187	65926.180	65880.150
## NA12891	26106.639	25243.345	29954.504	36623.335	31705.711	30511.444
## NA12892	33329.378	32933.371	23618.678	21115.655	28969.900	34814.274
## NA18486	50987.071	53237.342	56506.140	60188.695	58740.563	57021.003
## NA18498	74412.209	75594.016	80158.405	80466.078	79760.308	78330.220
## NA18499	58811.126	57846.180	65047.407	72225.988	66408.460	59507.687
## NA18501	28526.608	27930.044	26336.153	22211.734	26142.193	31322.004
## NA18502	54754.946	54586.490	61991.499	67113.460	61454.362	57489.946
## NA18504	33237.799	32828.665	36174.674	43780.390	42336.377	36175.520
## NA18505	39834.203	39059.609	42939.689	41739.266	42264.055	42783.755
## NA18507	53511.271	53951.616	60072.653	60892.302	57934.502	56239.757
## NA18508	51732.784	51444.190	58167.234	61815.475	57528.026	53555.260
## NA18510	36482.314	36111.795	42911.070	47826.482	40295.840	38040.349
## NA18511	72354.874	73915.756	79330.672	84599.668	81070.725	74883.864
## NA18516	29998.695	29824.990	30878.066	27847.915	28163.710	33121.055
## NA18517	79950.615	81805.824	87198.692	89803.645	86765.329	85454.084
## NA18519	70081.049	71109.002	77903.516	84657.440	78314.765	73226.465
## NA18520	67261.218	68592.878	73796.618	74421.053	71971.908	71123.960

## NA18522	52188.012	51096.388	58096.706	59609.043	55082.800	53892.618
## NA18523	23843.597	25195.334	24708.920	23930.308	25754.014	28687.351
## NA18852	48024.843	47218.139	55067.425	59497.669	53493.550	48931.387
## NA18853	126127.686	132432.629	129986.544	130795.259	134968.376	136375.404
## NA18855	55149.150	56040.652	62471.866	67857.073	62942.613	58322.445
## NA18856	33992.797	33422.641	25340.648	18245.292	28195.810	35273.907
## NA18858	55189.236	55483.839	62606.476	65352.521	59942.826	58157.343
## NA18861	35653.886	34913.606	37680.757	37276.807	39016.385	38317.384
## NA18862	57985.200	60231.785	62406.189	64684.206	65020.433	62834.674
## NA18870	31731.033	32494.960	37585.603	38298.891	35734.047	35810.874
## NA18871	37645.199	38108.363	41475.070	41783.696	40504.198	38505.216
## NA18909	65084.806	66714.225	71957.427	75676.661	72922.151	67641.977
## NA18912	28811.259	30709.265	24637.942	26193.907	31881.068	33407.192
## NA18913	62524.213	64148.115	70533.560	75281.551	70309.651	66007.362
## NA18916	71861.529	71036.429	73016.147	78658.953	79522.041	70449.222
## NA19093	73043.677	70350.828	76374.066	79779.360	77446.745	70832.353
## NA19098	59433.968	60350.541	65412.686	67670.141	65963.334	63262.107
## NA19099	60688.920	60415.197	67122.787	69828.427	66284.922	62146.730
## NA19101	49870.501	50902.075	56312.983	58612.854	56363.391	52964.314
## NA19102	31599.036	33051.508	26166.853	24787.548	32319.893	35168.353
## NA19108	65337.375	66835.485	71687.144	74373.464	72894.615	68574.026
## NA19114	100760.641	103234.577	104792.915	110569.430	111181.176	104666.470
## NA19116	69109.585	71619.903	76561.446	79870.034	78732.828	75702.628
## NA19119	35601.951	35592.916	26409.144	22619.632	31289.880	36850.831
## NA19127	53784.319	55978.922	57160.584	56512.181	57552.017	58187.127
## NA19128	77707.166	80942.790	82310.256	81989.833	83195.306	84067.866
## NA19130	57528.972	55962.262	61753.922	63553.390	61134.154	58688.351
## NA19131	63510.746	63421.974	68324.835	72752.630	70986.942	64479.061
## NA19137	46075.015	44058.259	50869.937	52992.167	47365.264	46929.572
## NA19138	67725.977	67005.891	74146.428	80086.299	75907.011	68477.690
## NA19140	55135.890	56384.014	59818.887	61185.052	59692.971	58778.062
## NA19143	55581.671	57517.007	62786.924	62609.232	60139.222	58871.011
## NA19144	61221.085	62741.243	68428.347	71552.190	67729.196	65478.818
## NA19147	54830.188	57424.236	61756.020	62097.202	60749.365	59491.018
## NA19152	72697.612	73803.572	80436.451	83839.484	78585.527	75401.194
## NA19153	46307.980	45525.095	50622.486	56525.018	54759.023	48199.052
## NA19159	52970.341	52948.786	58876.568	64135.618	60539.251	56874.324
## NA19160	56435.134	58254.742	63494.801	64768.449	62089.722	60304.688
## NA19171	27582.065	25345.433	20317.428	16579.335	22624.189	27685.043
## NA19172	67768.241	67240.346	74226.369	81059.079	77444.129	69235.265
## NA19190	44218.446	45627.761	49898.487	49763.070	50139.497	48035.461
## NA19192	55302.309	55035.311	60890.710	66524.202	62996.293	57954.390
## NA19193	71827.512	75963.681	75694.711	77763.005	79425.062	78913.043
## NA19200	25491.733	21259.394	19564.516	26280.628	28420.811	23104.136
## NA19201	60916.063	61298.575	67025.246	71578.973	68860.099	64400.555
## NA19203	46779.447	48175.101	51552.762	52432.202	51902.950	50172.499
## NA19204	48046.759	46505.762	53568.700	59340.745	53950.010	49357.451
## NA19209	84178.806	84328.853	92006.878	96844.552	91901.326	87965.196
## NA19210	77161.823	79993.256	82590.475	83624.137	83108.151	83634.401
## NA19222	31980.111	30606.511	32914.966	30969.056	30668.661	34191.485
## NA19225	41250.494	42698.532	44573.061	44385.541	46759.300	44599.239
## NA19238	40977.281	40915.459	43952.545	45365.745	45691.500	43074.657
## NA19239	46800.506	45377.197	49621.393	49701.116	47628.252	47528.823
## NA19257	44397.789	47126.028	50528.808	48850.888	48811.846	48970.574

	NA07346	NA07347	NA07357	NA10847	NA10851	NA11829
## NA06986						
## NA06994						
## NA07000						
## NA07037						
## NA07051						
## NA07346						
## NA07347	11382.951					
## NA07357	34438.963	30727.295				
## NA10847	19748.155	17982.845	21688.897			
## NA10851	25719.365	23482.923	18229.601	10454.515		
## NA11829	30162.970	25245.519	25268.829	28839.215	28605.364	
## NA11830	25792.463	20790.547	21071.952	22357.981	21790.327	14775.825
## NA11831	50095.600	45305.026	39254.855	47875.750	45433.026	33792.762
## NA11832	54175.695	46878.228	42786.487	49424.051	45655.335	38908.928
## NA11840	58204.761	51494.006	42945.924	52186.772	47746.829	37445.362
## NA11881	15950.906	13601.792	23668.469	13659.553	17783.357	23133.795
## NA11894	41857.835	38066.467	40234.663	39338.950	37783.076	37944.531
## NA11918	21595.459	26068.447	45746.248	30514.885	37742.643	45382.486
## NA11920	61055.186	55871.001	47190.417	53348.977	48859.611	48110.497
## NA11931	61655.280	56414.870	50342.501	56550.654	51476.132	50372.352
## NA11992	71218.016	65791.318	45839.185	58665.070	51926.362	54970.715
## NA11993	45791.275	42037.027	28968.228	35726.643	32414.549	35604.179
## NA11994	38992.941	32550.493	27765.348	32521.831	28795.648	28117.931
## NA11995	39835.927	33860.242	26334.745	34645.975	31114.736	22572.999
## NA12003	49889.283	44868.115	30809.008	42481.843	38417.870	29182.981
## NA12004	15757.741	21577.998	41493.546	27856.173	34976.569	36987.147
## NA12005	45542.473	40591.917	31013.738	40328.216	35727.769	26752.486
## NA12006	64630.390	59882.855	48936.225	57181.312	51041.299	52082.020
## NA12043	52454.784	45440.642	38703.867	46253.536	41784.919	35386.186
## NA12044	57842.880	52586.400	36986.978	49029.964	42610.643	40979.592
## NA12045	71245.560	66898.910	55803.471	59684.868	54975.807	69872.857
## NA12144	15387.417	13557.749	27382.699	19770.934	23150.208	22416.847
## NA12154	63466.552	57857.887	42061.151	54389.871	47942.776	48192.458
## NA12155	36423.268	30167.363	26913.439	30546.171	26978.430	24774.131
## NA12156	21692.677	18091.694	24129.423	22045.358	22127.959	18403.116
## NA12234	39355.711	33940.505	29264.606	36053.817	33357.104	22621.671
## NA12249	44452.070	39523.309	32165.096	40327.820	36442.956	26520.219
## NA12287	46356.253	40677.024	40609.649	44387.218	41854.322	33125.127
## NA12414	40704.493	34564.062	41554.876	40583.665	40167.773	36101.293
## NA12489	38604.260	36361.481	28691.070	26280.806	22518.048	41486.327
## NA12716	45118.599	42334.320	24753.342	33822.928	26675.039	38593.030
## NA12717	31077.080	30042.960	23309.000	22132.517	21825.563	34739.821
## NA12750	23945.644	22064.524	27202.832	24235.513	26272.286	28379.100
## NA12751	21731.267	18541.053	30768.887	24758.897	25156.494	24828.191
## NA12760	47966.820	40712.949	33104.856	41497.589	37580.159	30740.582
## NA12761	31428.886	25400.040	28607.658	28255.809	27551.946	21575.049
## NA12762	12486.308	16788.913	38762.734	24623.829	30969.320	32364.421
## NA12763	24154.523	20482.028	25217.381	24263.656	24470.943	17007.325
## NA12776	54317.542	48638.864	46879.218	51557.949	48047.173	42162.745
## NA12812	52991.939	45996.617	40767.888	44244.765	39332.797	40471.905
## NA12813	18779.103	18888.336	33695.744	21231.584	25849.672	36352.853
## NA12814	54013.845	48125.100	32710.041	43394.283	37160.517	40052.003
## NA12815	35247.063	31067.677	20312.202	28573.714	24600.082	21152.688

## NA12828	42419.410	37230.416	36961.101	39886.721	36290.415	31994.141
## NA12872	43981.233	37087.576	31689.001	35634.484	31183.084	35215.869
## NA12873	73888.800	69176.803	53098.521	66513.501	60597.376	53270.542
## NA12874	59113.984	58277.124	46941.686	48701.494	45861.299	64506.959
## NA12891	37294.455	32988.921	27977.441	30303.860	26523.454	28294.940
## NA12892	14524.245	20395.446	39778.127	24261.925	31275.180	39090.316
## NA18486	62605.821	57784.402	44281.929	51574.833	44716.820	52444.678
## NA18498	84401.240	78845.634	69830.301	75583.276	69380.595	76997.104
## NA18499	75620.877	69637.126	55284.796	67481.533	61582.951	56338.797
## NA18501	25670.794	21337.758	35287.288	26008.451	27317.628	34350.145
## NA18502	70728.626	65129.321	53830.165	62277.636	56202.926	55419.685
## NA18504	45454.885	41777.912	28756.665	37684.191	31723.677	34421.318
## NA18505	47421.460	42061.323	42935.685	42475.812	39435.123	43139.904
## NA18507	66674.150	60025.757	53524.939	60327.452	55360.962	52880.945
## NA18508	66607.057	60215.669	51091.685	59231.844	53808.812	51405.542
## NA18510	51787.687	45112.641	39898.010	44969.249	41021.529	35538.101
## NA18511	88910.210	83002.982	65193.472	79106.616	72181.165	70508.928
## NA18516	32730.989	27371.620	36528.425	29402.982	29617.111	35089.149
## NA18517	94224.226	87783.274	74644.922	82749.470	76240.830	80660.851
## NA18519	87624.607	82152.284	65397.464	78178.535	71940.564	68979.424
## NA18520	79529.820	72262.600	64929.912	70425.504	65013.402	67947.799
## NA18522	64818.677	58479.950	53430.106	58059.249	53138.041	53105.770
## NA18523	27392.201	20877.247	27990.214	23519.098	22563.553	27939.140
## NA18852	63827.083	56752.174	48406.497	57510.337	52704.723	44476.309
## NA18853	131768.370	130811.303	115352.824	119109.561	113721.118	131769.890
## NA18855	72908.738	66556.338	53369.086	64913.932	59472.963	51280.816
## NA18856	16625.644	19214.690	40870.548	25217.621	31473.386	39629.909
## NA18858	70568.664	63577.211	55681.993	62398.955	57107.667	54637.369
## NA18861	42222.395	36476.456	38579.979	39530.001	36997.010	38073.647
## NA18862	67471.482	62429.381	49564.165	56462.348	50787.320	59989.759
## NA18870	44439.744	37460.119	36486.599	39862.978	36371.352	31347.049
## NA18871	47747.652	39892.759	39024.151	42758.233	39670.836	36386.274
## NA18909	81282.999	74908.220	61337.831	73210.939	67151.067	62973.834
## NA18912	24960.451	25138.857	29765.254	22194.990	24008.251	35597.043
## NA18913	80148.232	73391.830	58846.725	70462.655	64064.174	60945.849
## NA18916	81972.622	78739.688	63447.749	76523.691	71406.593	66817.341
## NA19093	85538.694	79461.979	72022.207	80908.979	76031.107	68993.884
## NA19098	72358.319	66446.153	56199.026	64082.930	58183.095	61125.928
## NA19099	75544.252	68718.084	60537.825	69733.570	64467.884	58333.034
## NA19101	63778.142	57036.958	48400.640	56478.391	51293.425	50051.816
## NA19102	23950.518	26151.126	35010.350	25882.384	28743.751	37909.783
## NA19108	79607.165	73115.522	60950.460	71496.242	65584.049	65128.625
## NA19114	113252.399	110061.016	90027.099	102785.461	96107.293	100425.515
## NA19116	83954.525	78868.231	63824.503	73764.487	66652.886	71407.281
## NA19119	18557.573	23643.764	41638.312	27769.741	34350.513	40773.860
## NA19127	60260.889	55710.142	48589.262	50788.976	46753.421	56940.524
## NA19128	85245.657	81417.396	71700.847	74292.444	69434.249	82406.575
## NA19130	67590.749	61548.317	56925.498	60884.873	56224.310	59005.476
## NA19131	77708.911	71864.878	59403.212	70502.926	64705.685	60718.965
## NA19137	57135.199	50848.451	49171.269	51627.918	47503.319	44993.929
## NA19138	85325.820	79033.503	66719.849	79191.228	73503.736	63218.543
## NA19140	65218.209	59466.164	51067.452	55858.638	50785.988	57541.150
## NA19143	69380.438	61852.063	57077.711	63804.437	59619.340	53604.521
## NA19144	76257.942	69571.420	58669.457	66596.201	61074.717	62066.648

## NA19147	67736.443	62295.686	54071.286	60985.750	55612.544	55588.303
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## NA19153	59517.399	54562.429	42732.565	52518.168	46892.198	46882.255
## NA19159	67929.249	62917.198	50536.445	59912.050	54636.776	50267.822
## NA19160	70582.963	62914.377	54465.271	62027.863	56862.257	56426.346
## NA19171	18284.400	15602.750	35276.310	23538.047	28009.969	31565.314
## NA19172	83760.280	78959.753	64366.782	77012.389	70556.015	66428.361
## NA19190	56197.731	50476.143	48290.457	52878.035	48881.342	45356.357
## NA19192	69115.381	63680.445	50501.284	60018.046	53670.095	55196.519
## NA19193	79870.383	76907.276	61629.550	67005.346	61569.363	75618.359
## NA19200	27654.219	25243.973	30025.613	29354.771	29865.706	25652.392
## NA19201	74757.864	69691.599	55873.874	65838.881	59594.164	61677.356
## NA19203	57106.174	52199.761	43755.923	48676.975	43989.124	48385.272
## NA19204	61412.602	55861.990	47418.788	54961.702	49120.800	47243.545
## NA19209	100733.258	95049.154	81128.081	91354.674	84765.417	84277.589
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## NA19222	34926.848	28650.758	37718.705	32393.436	31868.440	35741.588
## NA19225	50223.868	45687.985	41256.427	45853.042	41860.106	42449.422
## NA19238	49728.446	43790.088	39942.771	43144.418	39310.795	43640.628
## NA19239	53622.881	46941.239	47390.581	47969.188	45118.112	48652.847
## NA19257	55657.927	49382.473	46375.329	50657.725	47099.421	44934.607
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## NA11931	47516.777	50944.098	26019.220	35744.798	57635.360	44867.420
## NA11992	52997.137	51804.088	43620.593	41082.803	61227.697	49505.190
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## NA12003	28086.287	33361.865	34355.206	29867.084	41839.503	43452.409
## NA12004	33792.767	53990.334	63814.770	68644.855	23261.084	50089.080
## NA12005	25865.500	33482.069	30626.996	25619.879	37742.594	41545.414
## NA12006	50558.935	45037.620	40826.350	39558.924	57334.081	47067.561
## NA12043	33405.575	38769.452	17713.394	21161.380	45576.136	40454.023
## NA12044	39394.161	46766.510	31784.395	26439.267	49534.882	46378.000
## NA12045	65033.205	67658.762	58798.228	65230.058	64343.652	61874.792
## NA12144	17725.178	37610.834	45316.871	50828.400	13565.939	35815.581

## NA12154	45499.292	39691.602	32392.893	34111.093	55073.126	49457.796
## NA12155	21040.432	36263.190	27308.094	27182.055	28385.710	34122.201
## NA12156	10989.511	33937.106	37293.230	41906.158	18281.020	34867.128
## NA12234	21034.341	17975.215	29151.411	33556.881	31629.695	37011.381
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## NA12287	31132.662	46108.562	27709.153	31374.211	43633.223	38110.129
## NA12414	32109.806	45646.237	30221.720	43911.389	39544.782	41166.416
## NA12489	36019.130	53001.306	46831.266	51446.240	33747.177	40859.434
## NA12716	33230.041	41042.117	44915.969	46210.978	36162.537	43808.078
## NA12717	29129.375	50349.980	50939.918	53189.455	26493.665	39505.188
## NA12750	23549.171	33927.407	45172.860	52224.532	18623.995	37977.196
## NA12751	20573.360	36032.706	39758.444	45756.210	18663.311	33335.299
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## NA12761	20436.412	36675.741	40599.970	39926.350	21759.631	34546.404
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## NA12872	30818.383	41788.589	23724.299	31479.391	37307.052	37852.366
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## NA18501	29380.069	46800.253	42767.256	49529.075	25239.336	38546.844
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## NA18504	30891.198	35315.251	33659.265	37632.766	37906.126	35757.986
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## NA18507	52155.266	51978.517	31533.224	36409.685	59059.862	49100.884
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## NA18510	34722.721	47095.698	26835.037	26607.461	45460.140	41298.137
## NA18511	69645.412	61647.161	48954.472	47875.166	79311.192	68922.364
## NA18516	31156.384	48326.756	38756.129	47677.479	29867.423	34297.333
## NA18517	79089.625	78620.938	58974.893	57776.873	85856.366	71900.405
## NA18519	69224.984	71696.401	52025.208	48548.461	79457.674	69171.817
## NA18520	66120.046	66260.774	44869.253	51253.598	72363.483	60060.476
## NA18522	51265.344	56365.950	32824.902	36284.092	59089.263	49382.080
## NA18523	23347.326	40412.257	37156.380	44112.301	22156.672	32359.344
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## NA18858	53975.173	57908.667	32679.315	33246.581	63337.742	52767.341
## NA18861	34964.715	38458.336	32700.511	40451.227	36442.059	40293.310
## NA18862	56931.001	57804.645	47877.060	54799.938	59586.581	53261.628
## NA18870	30374.944	38395.402	27943.854	30743.966	36479.242	36431.404
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## NA18912	30357.820	46659.784	50601.238	58374.264	22461.767	37845.480
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## NA18916	66985.543	45864.110	60405.455	62834.625	73557.325	71189.275
## NA19093	69278.876	53367.972	47868.950	53485.643	77876.569	67116.047
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## NA18516	42105.500	47718.451	46122.120	57195.329	42821.899	28425.781
## NA18517	105889.962	53185.471	54854.446	43373.350	69486.180	63692.381
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## NA18520	89875.468	48465.286	46122.101	46352.053	62394.077	51671.045
## NA18522	78334.341	37448.346	32270.784	45686.263	54583.573	36729.394
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## NA19127	67028.396	52705.108	50453.714	49333.020	51466.511	45396.294
## NA19128	89822.911	67549.290	66279.894	60084.592	69812.215	68207.116
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## NA19137	72849.404	34677.685	32899.001	46649.884	50146.677	34383.672
## NA19138	99018.595	54840.267	49250.871	47391.585	66939.227	54650.972
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## NA18519
## NA18520
## NA18522
## NA18523
## NA18852
## NA18853
## NA18855
## NA18856
## NA18858
## NA18861
## NA18862
## NA18870
## NA18871
## NA18909
## NA18912
## NA18913
## NA18916
## NA19093
## NA19098
## NA19099
## NA19101
## NA19102
## NA19108
## NA19114
## NA19116
## NA19119
## NA19127
## NA19128
## NA19130
## NA19131
## NA19137
## NA19138
## NA19140
## NA19143
## NA19144
## NA19147
## NA19152
## NA19153
## NA19159
## NA19160
## NA19171
## NA19172
## NA19190
## NA19192
## NA19193
## NA19200
## NA19201
```

```

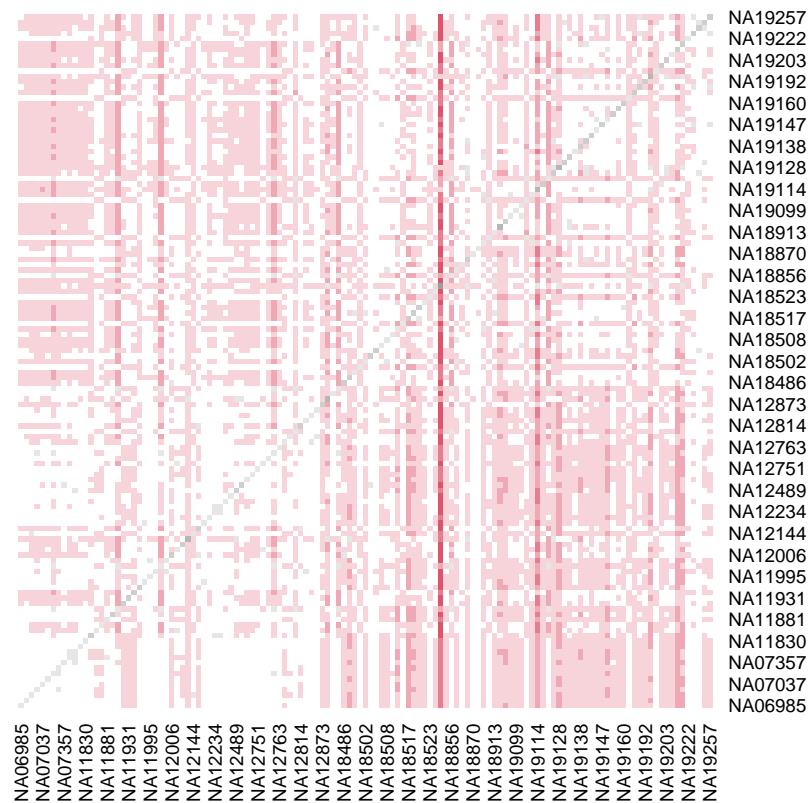
## NA19203
## NA19204
## NA19209
## NA19210
## NA19222
## NA19225
## NA19238
## NA19239 18932.766
## NA19257 33444.999 36869.645

```

```

#Buat heatmap
colramp = colorRampPalette(c("white", "red"))(9)
heatmap(as.matrix(dist1), col=colramp, Colv=NA, Rowv=NA)

```



```

#Cluster Dendrogram
hclust1 = hclust(dist1)
hclust1

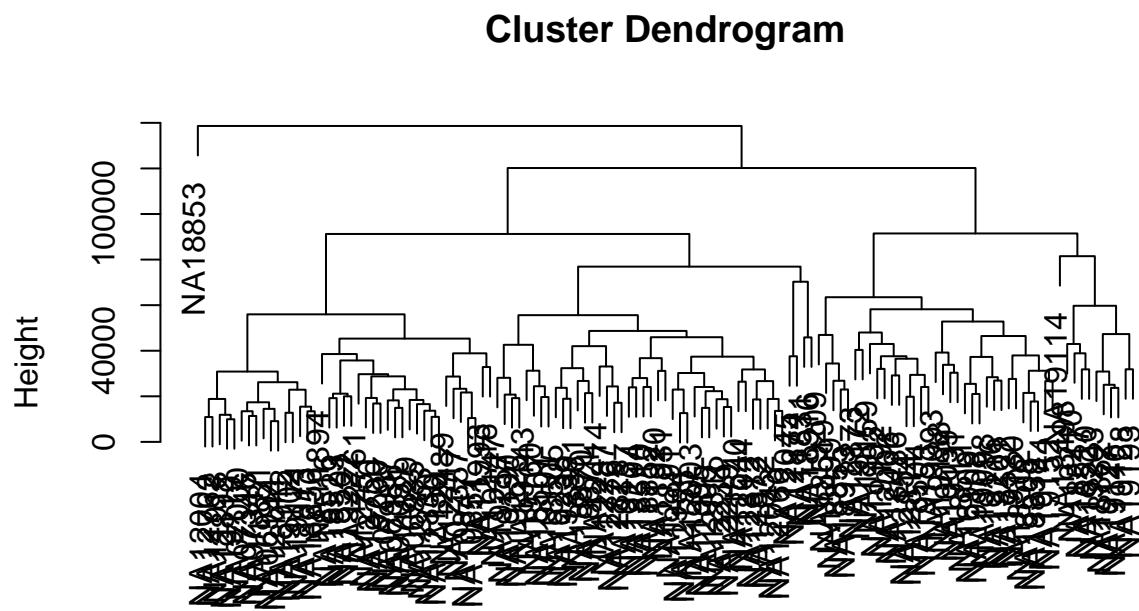
```

```

##
## Call:
## hclust(d = dist1)
##
## Cluster method : complete
## Distance       : euclidean
## Number of objects: 129

```

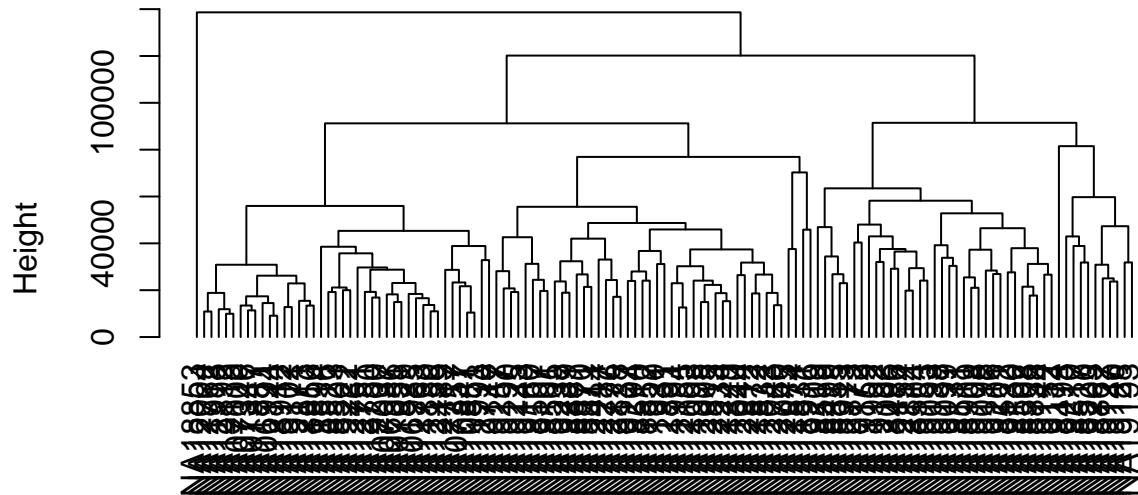
```
plot(hclust1)
```



dist1  
hclust (\*, "complete")

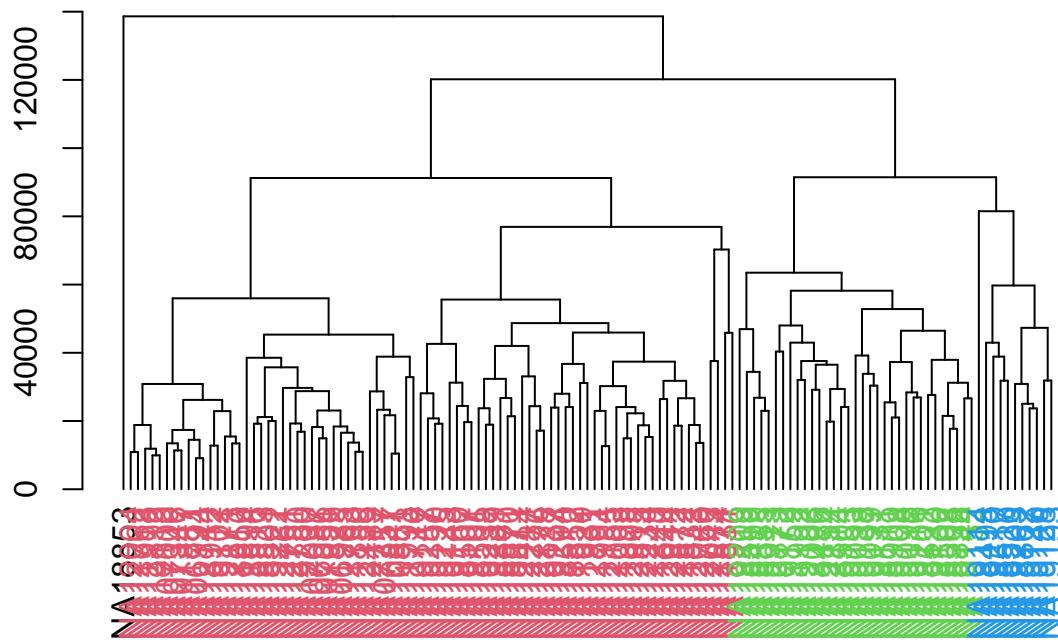
```
plot(hclust1,hang=-1)
```

## Cluster Dendrogram

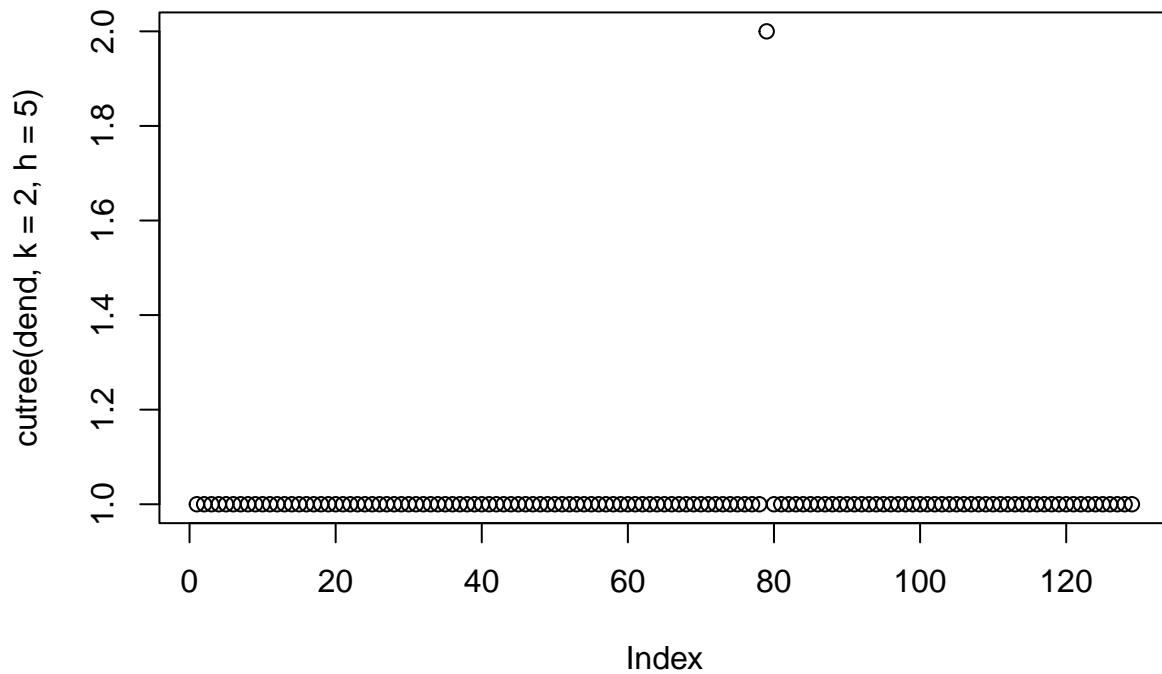


```
dist1  
hclust (*, "complete")
```

```
#Buat dendrogram  
dend = as.dendrogram(hclust1)  
dend = color_labels(hclust1, 4, col=1:4)  
plot(dend)
```



```
#Cutree  
plot(cutree(dend, k=2, h=5))
```



### Clustering dengan kmeans

```

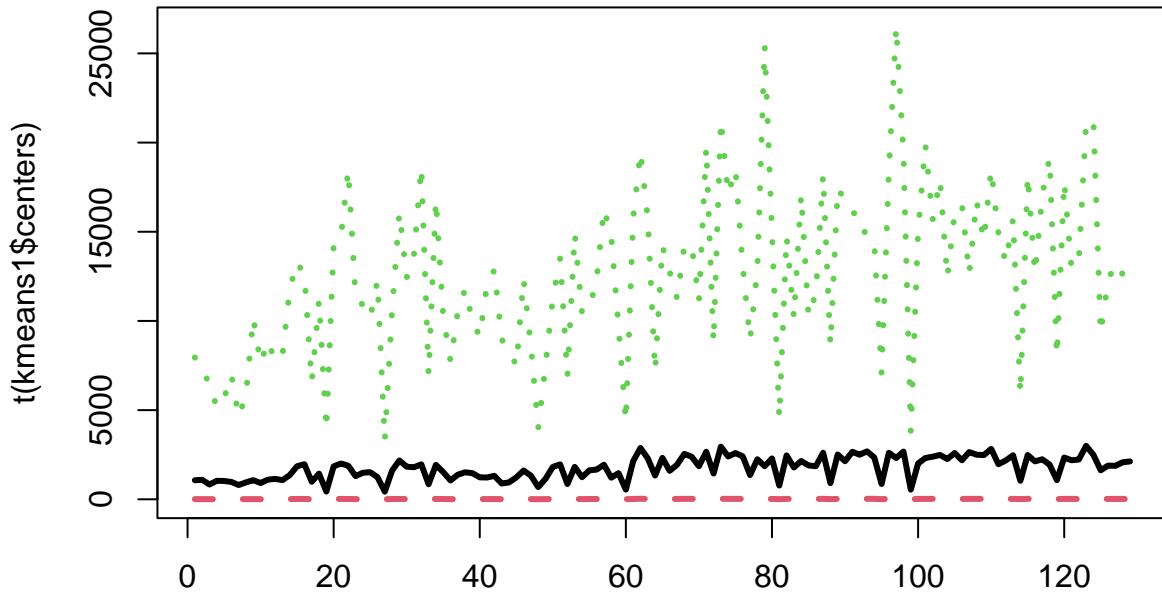
kmeans1 = kmeans(edata,centers=3)
names(kmeans1)

## [1] "cluster"      "centers"       "totss"        "withinss"     "tot.withinss"
## [6] "betweenss"    "size"          "iter"         "ifault"

####Plot pusat cluster

matplot(t(kmeans1$centers),col=1:3,type="l",lwd=3)

```



```
# cek berapa banyak gen di masing2 cluster
table(kmeans1$cluster)
```

```
##
##      1      2      3
##    471  52095     14
```

```
# cek cluster mana yang dikasih ke setiap gen
kmeans1$cluster[1:15]
```

```
## ENSG0000000003 ENSG0000000005 ENSG00000000419 ENSG00000000457 ENSG00000000460
##           2           2           2           2           2
## ENSG00000000938 ENSG00000000971 ENSG00000001036 ENSG00000001084 ENSG00000001167
##           2           2           2           2           2
## ENSG00000001460 ENSG00000001461 ENSG00000001497 ENSG00000001561 ENSG00000001617
##           2           2           2           2           2
```

```
#Heatmap dengan cluster yang sudah disortir
heatmap(as.matrix(edata)[order(kmeans1$cluster),], col=colramp, Colv=NA, Rowv=NA)
```

