```
library(survival)

bcancer  = read.table("c:\\NCSU\\My Teach\\ST745\\example\\cal8082.dat", as.is=T, header
= F)

event.time = bcancer[,1]

delta = bcancer[,2]

nodes = as.numeric(bcancer[,6])

er = as.numeric(bcancer[,7])
```

> fit = coxph(Surv(event.time,delta)~nodes+er)

> summary(fit)

```
Call:

coxph(formula = Surv(event.time, delta) ~ nodes + er)

  n=786 (119 observations deleted due to missingness)

                coef    exp(coef)       se(coef)         z             p

nodes       0.0532         1.055       0.00583     9.11     0.0e+00

er           -0.4221        0.656       0.09973    -4.23     2.3e-05

           exp(coef)   exp(-coef)     lower .95       upper .95

nodes         1.055         0.948          1.043           1.067

er             0.656          1.525         0.539           0.797


Rsquare= 0.101   (max possible= 0.999 )

Likelihood ratio test= 83.3  on 2 df,   p=0

Wald test            = 107  on 2 df,   p=0

Score (logrank) test = 107  on 2 df,   p=0
```

> fit2 = survfit(fit)

> summary(fit2)

Call: survfit.coxph(object = fit)

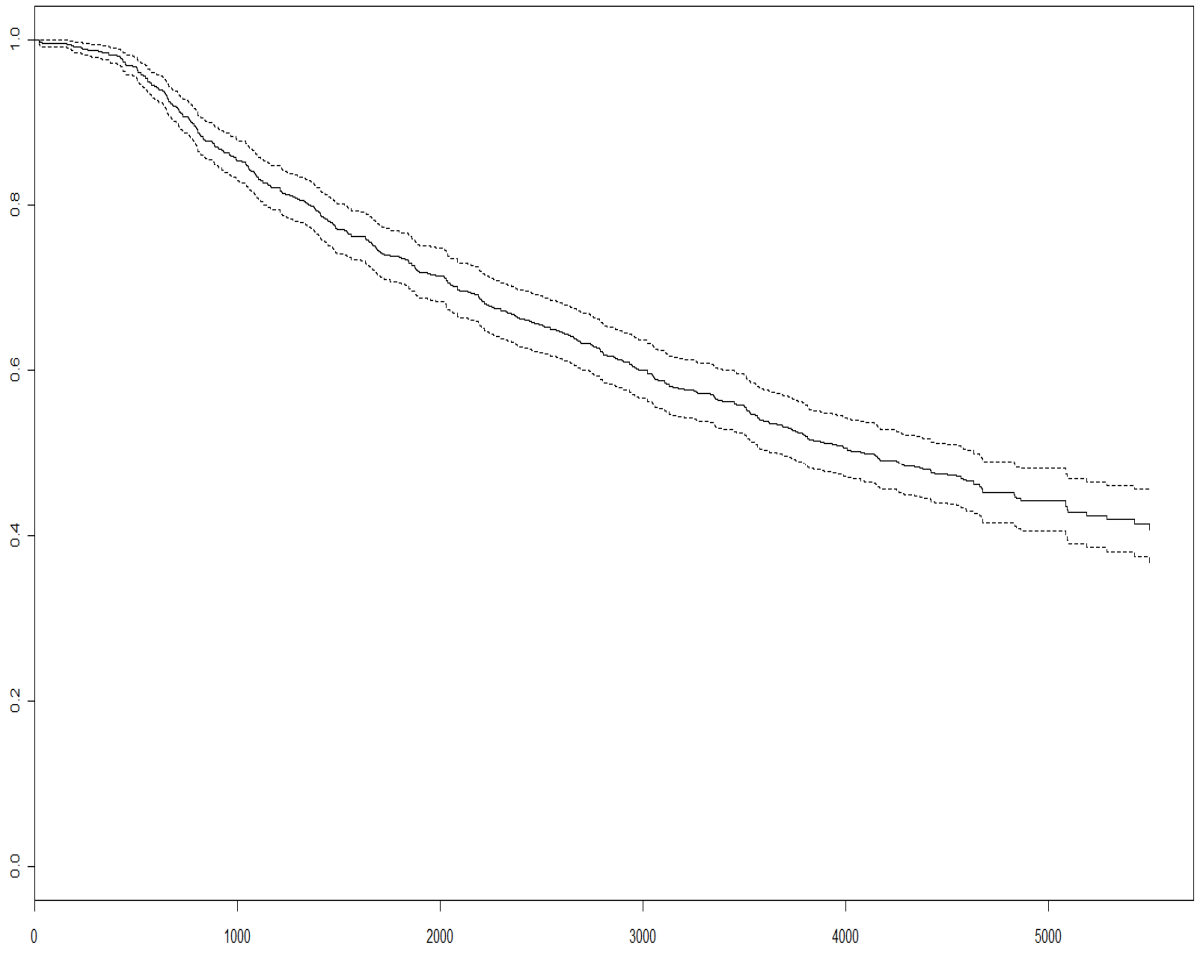
time	n.risk	n.event	survival	std.err	lower 95% CI	upper 95% CI
19	786	1	0.999	0.00113	0.997	1.000
20	785	1	0.998	0.00159	0.995	1.000
24	784	1	0.997	0.00195	0.993	1.000
35	783	1	0.995	0.00226	0.991	1.000
159	782	1	0.994	0.00252	0.989	0.999
171	781	1	0.993	0.00276	0.988	0.999
181	780	1	0.992	0.00298	0.986	0.998
190	779	1	0.991	0.00319	0.985	0.997
227	778	1	0.990	0.00339	0.983	0.996
236	777	1	0.989	0.00358	0.982	0.996
260	776	1	0.988	0.00375	0.980	0.995
279	775	1	0.986	0.00392	0.979	0.994
313	774	1	0.985	0.00408	0.977	0.993
330	773	1	0.984	0.00424	0.976	0.992
366	772	2	0.982	0.00454	0.973	0.991
370	770	1	0.981	0.00468	0.971	0.990
404	769	1	0.979	0.00482	0.970	0.989
418	768	1	0.978	0.00496	0.969	0.988
423	767	1	0.977	0.00509	0.967	0.987
432	766	1	0.976	0.00521	0.966	0.986
433	765	1	0.975	0.00534	0.964	0.985
435	764	1	0.974	0.00546	0.963	0.984

.....

.....

4628	251	1	0.463	0.01877	0.428	0.501
4629	248	1	0.461	0.01879	0.426	0.499
4658	244	1	0.459	0.01881	0.424	0.497
4668	238	1	0.457	0.01884	0.422	0.495
4671	236	1	0.455	0.01886	0.419	0.493
4673	235	2	0.451	0.01891	0.415	0.490
4827	198	1	0.449	0.01897	0.413	0.487
4832	196	1	0.446	0.01902	0.410	0.485
4838	194	1	0.444	0.01907	0.408	0.483
4863	190	1	0.441	0.01912	0.405	0.480
5082	127	2	0.434	0.01947	0.398	0.474
5090	123	1	0.431	0.01964	0.394	0.471
5093	122	1	0.427	0.01980	0.390	0.468
5185	108	1	0.423	0.02002	0.385	0.464
5285	91	1	0.418	0.02033	0.380	0.460
5422	75	1	0.413	0.02078	0.374	0.456
5495	61	1	0.407	0.02142	0.367	0.451

> plot(fit2)



index = (nodes ==1)|(nodes == 10)

event.time1 = event.time[index]

delta1 = delta[index]

nodes1 = nodes[index]

er1 = er[index]

fit3 = survfit(Surv(event.time1,delta1)~nodes1 + er1)

> summary(fit3)

Call: survfit(formula = Surv(event.time1, delta1) ~ nodes1 + er1)

33 observations deleted due to missingness

nodes1=1, er1=0

time	n.risk	n.event	survival	std.err	lower 95% CI	upper 95% CI
433	56	1	0.982	0.0177	0.948	1.000
435	55	1	0.964	0.0248	0.917	1.000
609	54	1	0.946	0.0301	0.889	1.000
638	53	1	0.929	0.0344	0.864	0.999
645	52	1	0.911	0.0381	0.839	0.989
650	51	1	0.893	0.0413	0.815	0.978
921	50	1	0.875	0.0442	0.793	0.966
1074	49	1	0.857	0.0468	0.770	0.954
1089	48	1	0.839	0.0491	0.748	0.941
1164	47	1	0.821	0.0512	0.727	0.928
1259	46	1	0.804	0.0531	0.706	0.915
1348	44	1	0.785	0.0549	0.685	0.901
1376	43	1	0.767	0.0566	0.664	0.886
1384	42	1	0.749	0.0581	0.643	0.872
1431	41	1	0.731	0.0595	0.623	0.857
1665	40	1	0.712	0.0608	0.603	0.842
1951	39	1	0.694	0.0619	0.583	0.827
2085	37	1	0.675	0.0630	0.562	0.811
2260	36	1	0.656	0.0640	0.542	0.795
2679	35	1	0.638	0.0648	0.522	0.778
2801	34	1	0.619	0.0656	0.503	0.762

2803	33	1	0.600	0.0662	0.483	0.745
3113	32	1	0.581	0.0668	0.464	0.728
3128	31	1	0.563	0.0672	0.445	0.711
3526	29	1	0.543	0.0676	0.426	0.693
4673	18	1	0.513	0.0703	0.392	0.671
4838	15	1	0.479	0.0734	0.355	0.647

nodes1=1, er1=1

time	n.risk	n.event	survival	std.err	lower 95% CI	upper 95% CI
19	97	1	0.990	0.0103	0.970	1.000
445	96	1	0.979	0.0144	0.952	1.000
557	95	1	0.969	0.0176	0.935	1.000
600	94	1	0.959	0.0202	0.920	0.999
642	93	1	0.948	0.0225	0.905	0.993
755	92	1	0.938	0.0245	0.891	0.987
1044	91	1	0.928	0.0263	0.878	0.981
1442	89	1	0.917	0.0280	0.864	0.974
1445	88	1	0.907	0.0295	0.851	0.967
1473	87	1	0.897	0.0310	0.838	0.959
1663	85	1	0.886	0.0324	0.825	0.952
1690	84	1	0.875	0.0336	0.812	0.944
1695	83	1	0.865	0.0349	0.799	0.936
1840	82	1	0.854	0.0360	0.787	0.928
2168	81	1	0.844	0.0371	0.774	0.920
2332	80	1	0.833	0.0381	0.762	0.911

2757	78	1	0.823	0.0391	0.750	0.903
2790	77	1	0.812	0.0400	0.737	0.894
2863	76	1	0.801	0.0409	0.725	0.885
2942	75	1	0.791	0.0417	0.713	0.877
3048	74	1	0.780	0.0425	0.701	0.868
3051	73	1	0.769	0.0432	0.689	0.859
3127	72	1	0.758	0.0439	0.677	0.850
3367	70	1	0.748	0.0446	0.665	0.840
3524	69	1	0.737	0.0452	0.653	0.831
3551	68	1	0.726	0.0459	0.641	0.822
3563	67	1	0.715	0.0464	0.630	0.812
3573	66	1	0.704	0.0470	0.618	0.803
3713	65	1	0.693	0.0475	0.606	0.793
3812	64	1	0.683	0.0480	0.595	0.783
4006	61	1	0.671	0.0485	0.583	0.774
4026	60	1	0.660	0.0489	0.571	0.764
4145	54	1	0.648	0.0495	0.558	0.753
4157	52	1	0.636	0.0501	0.545	0.742
4285	50	1	0.623	0.0507	0.531	0.731
4365	48	1	0.610	0.0513	0.517	0.719
4417	46	1	0.597	0.0519	0.503	0.707

nodes1=10, er1=0

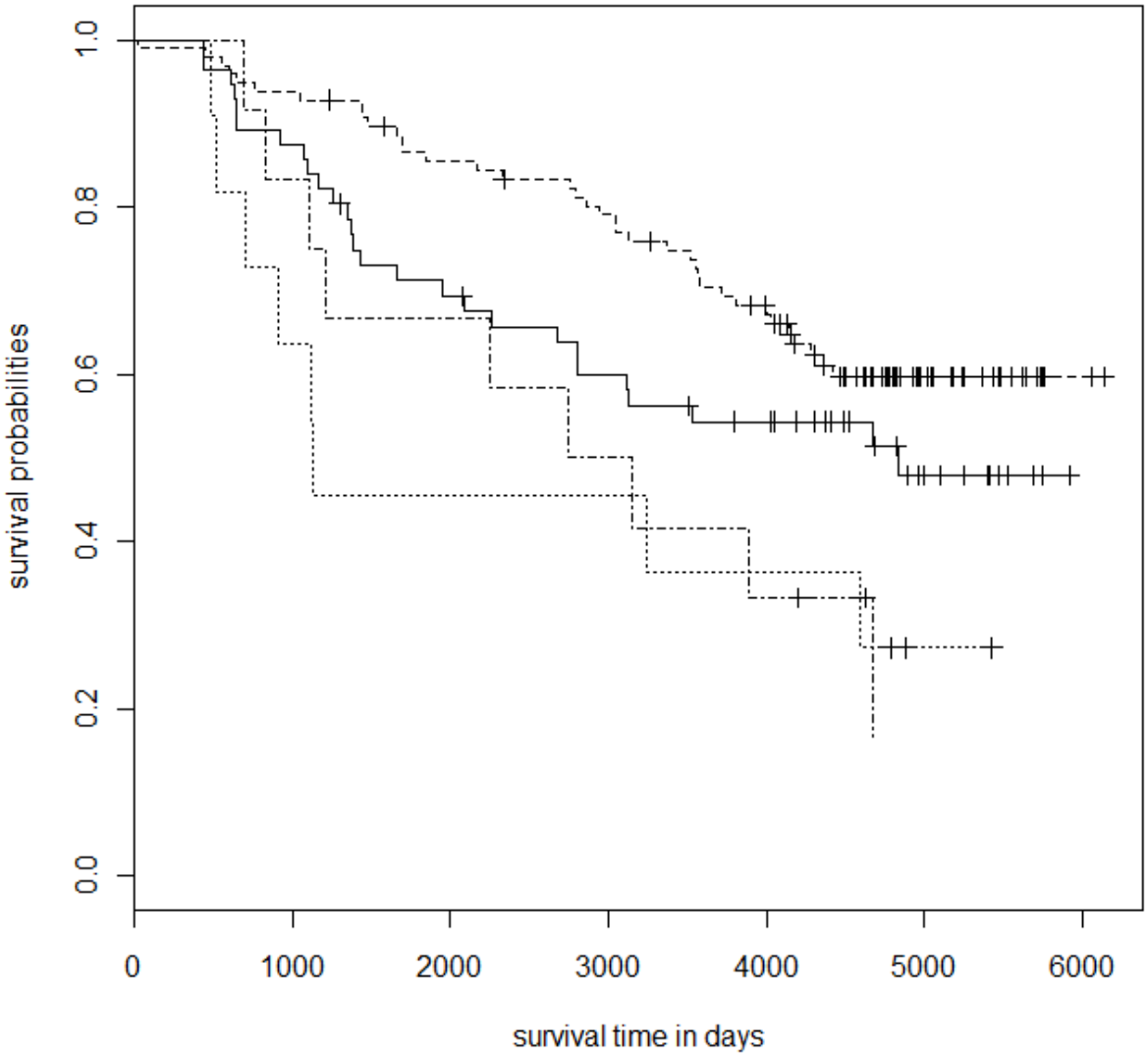
time	n.risk	n.event	survival	std.err	lower 95% CI	upper 95% CI
483	11	1	0.909	0.0867	0.754	1.000

516	10	1	0.818	0.1163	0.619	1.000
705	9	1	0.727	0.1343	0.506	1.000
907	8	1	0.636	0.1450	0.407	0.995
1114	7	1	0.545	0.1501	0.318	0.936
1128	6	1	0.455	0.1501	0.238	0.868
3248	5	1	0.364	0.1450	0.166	0.795
4591	4	1	0.273	0.1343	0.104	0.716

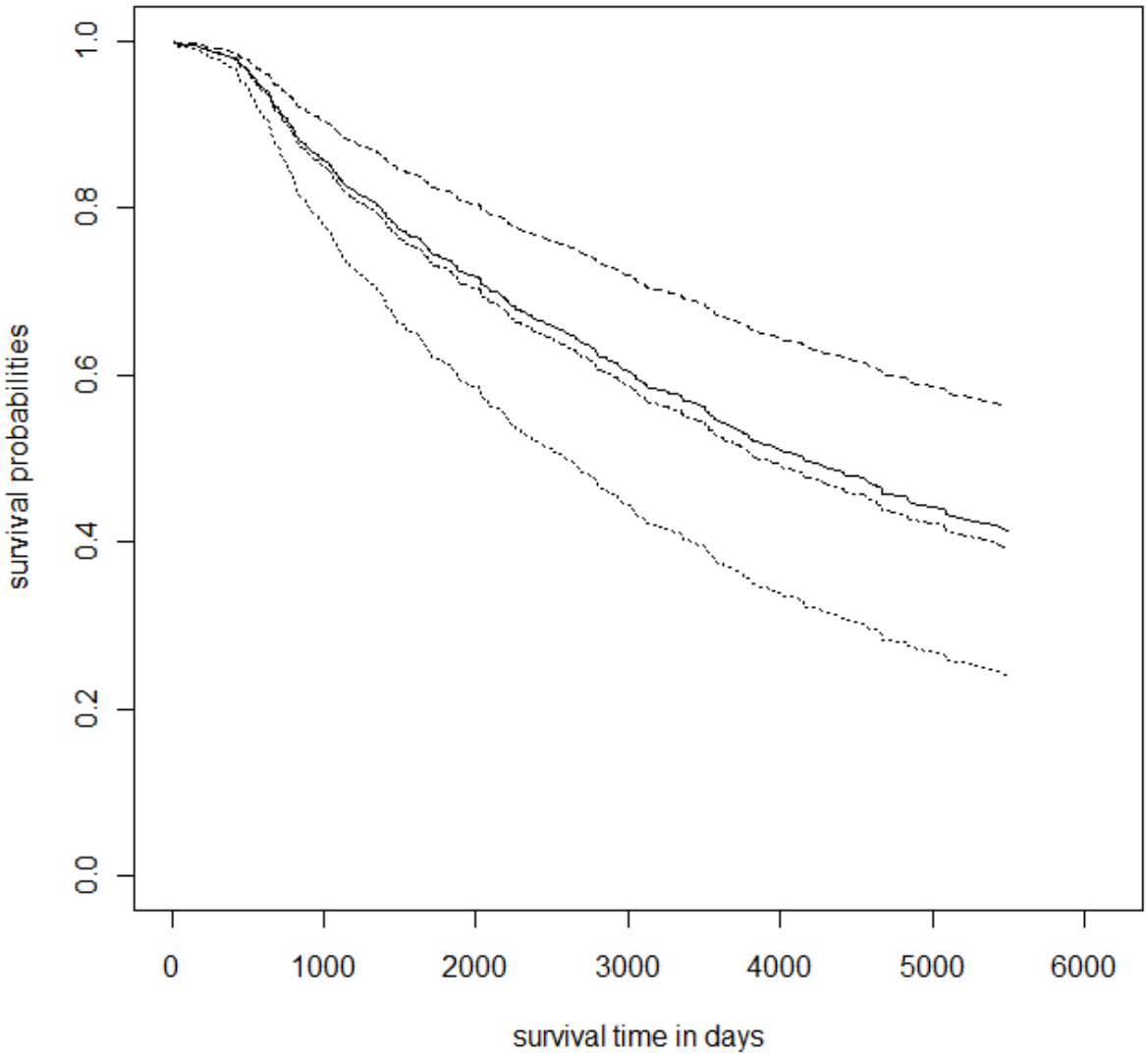
nodes1=10, er1=1

time	n.risk	n.event	survival	std.err	lower 95% CI	upper 95% CI
696	12	1	0.917	0.0798	0.7729	1.000
831	11	1	0.833	0.1076	0.6470	1.000
1104	10	1	0.750	0.1250	0.5410	1.000
1209	9	1	0.667	0.1361	0.4468	0.995
2254	8	1	0.583	0.1423	0.3616	0.941
2741	7	1	0.500	0.1443	0.2840	0.880
3146	6	1	0.417	0.1423	0.2133	0.814
3892	5	1	0.333	0.1361	0.1498	0.742
4673	2	1	0.167	0.1361	0.0336	0.826

> plot(fit3,xlab = "survival time in days",ylab = "survival probabilities",lty=c(1,2,3,4))



```
> fit4 = survfit(fit,newdata = c(1,0))

> fit5 = survfit(fit,newdata = c(1,1))

> fit6 = survfit(fit,newdata = c(10,0))

> fit7 = survfit(fit,newdata = c(10,1))

plot(0,0,  xlab = "survival time in days",ylab = "survival probabilities", pch=" ", ylim=c(0,1), xlim =
c(0,max(event.time)))

lines(fit4$time, fit4$surv,lty=1)

lines(fit5$time, fit5$surv,lty=2)

lines(fit6$time, fit6$surv,lty=3)

lines(fit7$time, fit7$surv,lty=4)
```


survival probabilities
0.0
0.2
0.4
0.6
0.8
1.0
0
1000
2000
3000
4000
5000
6000
survival time in days