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# APPENDIX

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## MINIX 3 C Compiler Performance Appendix

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## 2. Measurement data

### Compilation

Pentium 2 350MHz - Compilation time in ticks (60 ticks = 1 second)											
Compiler executions			python	gzip	bc	bzip2	awk	sorting	sed	whetstone	
Total source size (code + headers)			104 2028.85 kB	15 250.42 kB	12 194.20 kB	11 238.65 kB	10 104.30 kB	4 7.88 kB	1 45.04 kB	1 7.93 kB	
Time	Compiler	Optimization parameters									
Real	cc	-O1	2,146.2	200.6	166.8	334.4	130.8	40.1	33.5	16.6	
		-O2	3,082.2	304.9	253.5	473.2	202.8	62.8	49.0	23.8	
		-O3			378.4	882.5		98.1	70.4	36.4	
	gcc 3.4.3	-O0	7,088.3	792.5	663.6	849.3	566.6	449.6	173.8	145.8	
		-O1	9,056.0	951.1	799.5	1,248.5	700.6	454.4	228.0	158.6	
		-O2	13,007.5	1,226.9	1,058.0	2,160.7	949.7	464.4	333.2	186.0	
		-O2 -march=pentium2	13,040.8	1,248.7	1,057.2	2,184.0	969.3	467.4	342.8	188.2	
		-O2 -mtune=pentium2	13,049.0	1,243.2	1,057.3	2,180.0	967.8	464.7	345.2	187.6	
		-O3	16,975.1	1,379.6	1,474.0	2,603.1	1,497.2	475.0	417.4	201.2	
		-O3 -march=pentium2	16,940.6	1,404.6	1,453.5	2,639.8	1,504.8	478.4	432.4	208.6	
		-O3 -mtune=pentium2	17,034.1	1,405.7	1,467.8	2,611.6	1,494.9	476.0	428.8	207.6	
		-Os	12,178.0	1,152.7	981.2	1,964.6	886.3	461.3	324.2	176.4	
		-Os -march=pentium2	12,412.8	1,175.4	994.1	1,995.5	919.8	466.1	335.4	179.4	
		-Os -mtune=pentium2	12,420.1	1,173.2	992.7	1,987.2	918.4	461.8	337.6	179.0	
		gcc 4.1.1	-O0	17,042.7	1,944.1	1,528.0	1,665.4		635.3	232.8	197.2
	-O1		21,966.6	2,377.1	1,835.0	2,764.2		651.0	391.2	217.6	
	-O2		25,188.8	2,636.6	2,059.0	3,548.5		669.6	489.8	230.8	
	-O2 -march=pentium2		25,698.3	2,675.5	2,073.3	3,707.9		670.8	503.4	244.0	
	-O2 -mtune=pentium2		25,568.1	2,678.5	2,076.8	3,638.2		667.6	506.6	245.2	
	-O3		28,844.6	2,873.3	2,576.9	4,070.2		685.2	520.8	267.8	
	-O3 -march=pentium2		29,300.5	2,921.2	2,609.0	4,214.7		691.0	545.0	321.4	
	-O3 -mtune=pentium2		29,337.8	2,932.3	2,612.5	4,163.2		688.4	543.4	321.8	
	-Os		23,949.6	2,534.5	1,958.9	2,739.1		658.2	457.6	222.8	
	-Os -march=pentium2		24,542.8	2,572.1	1,989.3	2,867.9		663.2	473.8	230.6	
	-Os -mtune=pentium2		24,480.9	2,571.1	1,993.1	2,824.6		661.6	476.4	231.4	
	User		cc	-O1	1,451.6	116.9	101.7	269.9	76.5	14.0	25.8
		-O2		1,820.6	147.4	136.4	346.4	101.8	15.3	34.0	11.5
		-O3				175.0	675.2		18.9	47.6	14.4
		gcc 3.4.3	-O0	3,159.6	246.2	244.2	461.4	207.1	33.5	58.0	26.0
			-O1	5,126.3	403.0	379.3	861.7	340.8	41.1	112.2	41.4
-O2			9,075.9	681.2	637.3	1,774.0	590.4	52.8	220.0	69.4	
-O2 -march=pentium2			9,103.9	703.0	639.3	1,792.5	610.6	52.7	228.6	73.4	
-O2 -mtune=pentium2			9,112.2	696.9	639.5	1,790.5	606.4	52.2	230.2	72.2	
-O3			13,041.0	831.5	1,052.7	2,213.3	1,136.6	60.4	303.2	83.2	
-O3 -march=pentium2			12,996.0	859.5	1,033.1	2,248.9	1,145.0	64.4	316.4	90.0	
-O3 -mtune=pentium2			13,093.3	858.6	1,049.9	2,224.3	1,136.5	62.4	312.4	89.0	
-Os			8,260.0	609.0	563.1	1,577.8	527.3	51.4	210.2	60.4	
-Os -march=pentium2			8,474.1	629.5	573.9	1,611.0	559.8	50.6	220.2	63.0	
-Os -mtune=pentium2			8,493.5	628.6	573.5	1,600.8	560.2	51.6	224.0	63.8	
gcc 4.1.1			-O0	3,529.2	276.8	266.1	521.0		36.4	68.6	32.4
		-O1	8,454.9	708.4	572.7	1,620.4		55.6	222.6	52.4	
		-O2	11,679.6	967.1	798.1	2,404.0		72.0	323.0	66.8	
		-O2 -march=pentium2	12,163.1	1,007.6	818.9	2,559.4		74.6	339.2	80.6	
		-O2 -mtune=pentium2	12,060.1	1,012.9	815.4	2,489.7		73.2	338.4	81.0	
		-O3	15,311.7	1,204.7	1,318.4	2,920.6		88.2	353.8	103.4	
		-O3 -march=pentium2	15,766.9	1,258.6	1,355.0	3,064.1		90.8	377.6	156.6	
		-O3 -mtune=pentium2	15,795.5	1,261.7	1,349.4	3,007.3		89.8	378.6	157.8	
		-Os	10,435.3	868.4	702.8	1,594.5		64.2	293.0	56.6	
		-Os -march=pentium2	11,021.2	909.9	736.0	1,716.2		68.2	307.6	67.0	
		-Os -mtune=pentium2	10,981.1	909.9	738.8	1,669.7		66.8	311.0	64.6	
		System	cc	-O1	679.4	81.5	63.8	62.3	53.4	25.4	7.6
-O2				1,234.6	154.3	115.6	123.8	99.2	46.2	14.2	12.0
-O3						200.5	205.5		78.5	22.6	21.6
gcc 3.4.3			-O0	3,912.4	539.8	417.9	384.7	357.9	63.9	19.6	19.8
			-O1	3,903.4	544.3	418.4	384.5	357.6	65.0	19.4	18.6
	-O2		3,907.9	543.2	418.7	385.9	357.6	62.8	20.2	19.8	
	-O2 -march=pentium2		3,905.3	543.6	415.1	388.3	356.6	66.4	18.8	16.2	
	-O2 -mtune=pentium2		3,901.3	544.2	415.4	386.0	359.9	64.3	18.2	18.8	
	-O3		3,909.3	545.3	419.5	388.3	358.3	64.0	19.8	19.2	
	-O3 -march=pentium2		3,917.1	543.0	418.0	388.0	357.7	62.4	18.6	18.4	
	-O3 -mtune=pentium2		3,912.7	539.7	416.0	385.5	357.4	64.0	20.2	20.6	
	-Os		3,890.3	542.4	415.2	386.0	357.1	62.2	19.2	19.0	
	-Os -march=pentium2		3,910.7	539.5	406.7	381.7	357.9	63.0	20.6	18.4	
	-Os -mtune=pentium2		3,888.7	539.5	417.6	385.4	356.4	64.5	16.4	19.2	
	gcc 4.1.1		-O0	766.4	108.8	106.5	101.3		60.1	17.0	19.0
-O1			767.2	109.3	103.8	103.9		58.7	18.2	18.0	
-O2			768.7	111.0	107.0	105.3		63.0	20.4	18.8	
-O2 -march=pentium2			766.7	112.7	106.2	109.0		60.0	19.8	20.4	
-O2 -mtune=pentium2			777.0	108.6	106.0	106.4		59.2	19.2	19.6	
-O3			776.7	110.8	106.5	106.7		60.0	18.8	19.4	
-O3 -march=pentium2			783.0	113.0	106.9	108.4		59.4	18.6	19.6	
-O3 -mtune=pentium2			780.8	112.0	109.3	108.6		61.8	18.4	20.4	
-Os			752.5	106.0	104.9	103.5		60.4	18.8	17.8	
-Os -march=pentium2			758.3	106.3	104.9	103.9		60.0	18.6	17.6	
-Os -mtune=pentium2			761.9	108.6	106.2	104.4		58.2	19.2	18.4	

Figure 1 - Compilation times in ticks (Pentium 2 350MHz)

Pentium 3 1GHz - Compilation time in ticks (60 ticks = 1 second)											
Compiler executions			python	gzip	bc	bzip2	awk	sorting	sed	whetstone	
Total source size (code + headers)			104 2028.85 kB	15 250.42 kB	12 194.20 kB	11 238.65 kB	10 104.30 kB	4 7.88 kB	1 45.04 kB	1 7.93 kB	
Time	Compiler	Optimization parameters									
Real	cc	-O1	1,008.6	109.2	86.9	135.1	71.3	27.0	14.5	9.0	
		-O2	1,574.9	180.0	140.7	201.4	118.8	44.7	22.0	13.9	
		-O3			231.8	351.3		76.1	34.6	23.0	
	gcc 3.4.3	-O0	4,718.0	591.3	469.6	516.1	407.6	269.0	89.5	77.9	
		-O1	5,354.3	642.2	514.0	650.7	451.4	272.4	106.2	83.0	
		-O2	6,580.3	728.1	595.6	968.5	528.0	273.6	142.2	92.8	
		-O2 -march=pentium3	6,626.0	735.5	595.5	971.2	534.6	274.2	145.7	93.3	
		-O2 -mtune=pentium3	6,585.7	732.7	594.6	974.5	533.8	272.1	145.8	94.2	
		-O3	7,862.0	779.0	740.3	1,134.8	711.3	279.4	174.5	96.7	
		-O3 -march=pentium3	7,894.0	788.9	731.9	1,140.6	712.1	277.8	178.5	98.7	
		-O3 -mtune=pentium3	7,867.8	786.0	736.6	1,132.6	711.1	277.5	180.0	99.2	
		-Os	6,320.0	704.7	570.4	901.2	508.2	275.7	138.3	90.0	
		-Os -march=pentium3	6,410.2	713.5	575.0	906.3	519.6	275.8	143.5	90.8	
		-Os -mtune=pentium3	6,391.1	710.1	574.4	905.3	517.6	274.5	144.0	90.2	
		gcc 4.1.1	-O0	9,794.4	1,212.9	919.6	941.3		403.3	126.5	114.0
	-O1		11,386.5	1,365.9	1,026.9	1,341.3		408.6	181.0	118.8	
	-O2		12,420.6	1,452.9	1,102.1	1,594.3		414.2	211.7	123.2	
	-O2 -march=pentium3		12,582.1	1,462.3	1,107.0	1,641.4		415.2	216.2	129.2	
	-O2 -mtune=pentium3		12,560.8	1,461.4	1,106.2	1,629.1		414.6	215.7	129.7	
	-O3		13,610.4	1,534.0	1,279.4	1,768.0		418.7	224.3	137.9	
	-O3 -march=pentium3		13,791.1	1,547.1	1,286.8	1,818.6		420.5	230.1	155.5	
	-O3 -mtune=pentium3		13,784.7	1,547.1	1,285.6	1,802.9		421.2	231.3	155.8	
	-Os		12,025.0	1,420.4	1,064.6	1,320.6		409.7	202.9	120.8	
	-Os -march=pentium3		12,212.8	1,427.5	1,077.4	1,358.2		412.7	208.2	124.4	
	-Os -mtune=pentium3		12,196.8	1,427.9	1,075.6	1,347.4		412.3	206.7	123.0	
	User		cc	-O1	477.1	39.7	35.0	85.7	26.4	5.1	8.5
		-O2		604.1	49.5	45.4	109.8	36.9	5.6	11.2	3.9
		-O3				61.9	188.1		7.1	16.2	6.3
		gcc 3.4.3	-O0	1,090.8	85.2	85.0	164.2	74.4	13.1	19.5	9.7
			-O1	1,722.3	137.3	128.3	297.7	117.0	14.3	37.0	14.0
-O2			2,947.8	225.5	210.3	613.7	194.5	19.1	71.2	23.2	
-O2 -march=pentium3			2,988.0	229.6	210.2	621.4	200.5	19.2	74.8	24.3	
-O2 -mtune=pentium3			2,960.5	227.1	208.4	621.8	200.6	18.1	75.8	23.3	
-O3			4,221.4	274.9	353.6	780.5	376.0	22.1	104.5	29.3	
-O3 -march=pentium3			4,258.6	282.3	346.3	791.5	377.1	22.9	108.7	29.5	
-O3 -mtune=pentium3			4,237.4	277.9	349.5	780.7	377.8	22.4	109.6	31.5	
-Os			2,689.7	200.0	185.9	550.1	173.8	17.0	68.8	19.8	
-Os -march=pentium3			2,784.7	205.9	189.8	557.4	185.5	18.3	71.7	20.5	
-Os -mtune=pentium3			2,760.1	205.3	188.5	555.1	183.0	17.3	72.5	20.7	
gcc 4.1.1			-O0	1,231.1	95.9	92.2	185.6		14.0	23.0	10.7
		-O1	2,841.0	250.6	199.7	587.8		20.9	79.0	17.0	
		-O2	3,889.5	338.7	274.3	839.9		25.0	110.0	23.2	
		-O2 -march=pentium3	4,048.5	352.2	281.7	886.3		28.2	115.2	27.7	
		-O2 -mtune=pentium3	4,029.3	351.6	277.5	875.9		26.0	115.6	27.5	
		-O3	5,074.9	416.4	447.4	1,015.7		30.2	123.8	36.0	
		-O3 -march=pentium3	5,255.8	440.5	461.3	1,062.5		34.6	129.0	54.7	
		-O3 -mtune=pentium3	5,251.2	435.5	461.6	1,047.5		32.6	130.2	55.5	
		-Os	3,497.4	302.2	241.2	566.9		23.3	100.9	18.5	
		-Os -march=pentium3	3,692.2	318.3	251.3	601.0		25.2	105.5	23.6	
		-Os -mtune=pentium3	3,676.7	315.1	248.8	590.6		23.7	105.2	22.7	
		System	cc	-O1	525.5	68.4	51.1	48.6	44.1	21.5	5.9
-O2				960.3	128.8	94.4	90.6	80.9	38.5	10.7	9.9
-O3						168.8	161.6		68.2	18.4	16.6
gcc 3.4.3			-O0	3,620.2	504.0	384.3	350.1	332.8	38.0	11.5	11.6
			-O1	3,625.3	504.1	385.3	352.5	333.7	38.2	11.2	11.0
	-O2		3,622.5	501.8	384.6	353.6	333.0	37.6	10.8	10.7	
	-O2 -march=pentium3		3,629.8	505.2	384.4	349.0	327.6	39.5	11.0	11.7	
	-O2 -mtune=pentium3		3,619.0	504.7	385.6	352.0	333.1	38.0	10.8	10.3	
	-O3		3,633.2	502.9	386.0	353.4	334.4	39.4	11.5	9.7	
	-O3 -march=pentium3		3,620.6	505.4	384.6	348.6	334.7	37.9	10.0	10.5	
	-O3 -mtune=pentium3		3,618.4	507.7	386.6	350.6	333.2	38.7	10.1	10.0	
	-Os		3,624.1	504.0	383.6	350.3	328.2	38.5	11.2	11.0	
	-Os -march=pentium3		3,613.8	506.2	379.0	348.1	333.3	38.2	11.2	10.0	
	-Os -mtune=pentium3		3,625.8	504.2	385.3	349.8	334.0	38.5	11.2	10.3	
	gcc 4.1.1		-O0	434.0	67.9	67.0	64.1		36.9	10.3	10.2
-O1			440.8	69.5	68.9	65.9		35.9	10.0	11.2	
-O2			444.2	66.8	67.5	66.9		37.1	10.2	10.5	
-O2 -march=pentium3			443.0	66.9	67.1	66.8		37.8	10.7	10.5	
-O2 -mtune=pentium3			437.6	67.1	67.1	66.8		33.0	9.9	10.0	
-O3			442.5	68.6	68.8	65.7		36.9	10.8	9.6	
-O3 -march=pentium3			450.1	67.4	68.5	67.6		36.0	9.7	10.7	
-O3 -mtune=pentium3			448.4	67.2	67.9	66.8		39.1	10.0	10.0	
-Os			445.5	68.5	65.3	65.9		36.2	10.0	10.7	
-Os -march=pentium3			446.0	66.3	67.2	65.4		36.3	11.5	9.0	
-Os -mtune=pentium3			440.1	68.1	67.3	67.1		37.5	10.5	10.7	

Figure 2 - Compilation times in ticks (Pentium 3 1GHz)

Pentium 2 350MHz - Compilation time (indexed to cc -O1 at 100)														
			python	gzip	bc	bzip2	awk	sorting	sed	whetstone	AVERAGE excl. awk			
Compiler executions			104	15	12	11	10	4	1	1	19.75			
Total source size (code + headers)			2028.85 kB	250.42 kB	194.20 kB	238.65 kB	104.30 kB	7.88 kB	45.04 kB	7.93 kB	359.66 kB			
Time	Compiler	Optimization parameters												
Real	cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
		-O2	143.6	152.0	152.0	141.5	155.1	156.7	146.3	143.4	147.9	147.9		
		-O3			226.9	263.9		244.6	210.1	218.9				
	gcc 3.4.3	-O0	330.3	395.1	397.8	254.0	433.3	1121.1	518.8	877.0	556.3	556.3		
		-O1	422.0	474.1	479.3	373.4	535.8	1133.0	680.6	954.0	645.2	645.2		
		-O2	606.1	611.6	634.3	646.2	726.2	1158.0	994.6	1118.8	824.2	824.2		
		-O2 -march=pentium2	607.6	622.4	633.8	653.2	741.2	1165.4	1023.3	1132.0	834.0	834.0		
		-O2 -mtune=pentium2	608.0	619.7	633.9	652.0	740.1	1158.7	1030.4	1128.4	833.0	833.0		
		-O3	791.0	687.7	883.6	778.5	1145.0	1184.4	1246.0	1210.2	968.8	968.8		
		-O3 -march=pentium2	789.3	700.1	871.3	789.5	1150.8	1192.9	1290.7	1254.7	984.1	984.1		
		-O3 -mtune=pentium2	793.7	700.7	879.9	781.0	1143.2	1186.9	1280.0	1248.7	981.6	981.6		
		-Os	567.4	574.6	588.2	587.6	677.8	1150.3	967.8	1061.1	785.3	785.3		
		-Os -march=pentium2	578.4	585.9	595.9	596.8	703.4	1162.1	1001.2	1079.1	799.9	799.9		
		-Os -mtune=pentium2	578.7	584.8	595.1	594.3	702.3	1151.5	1007.8	1076.7	798.4	798.4		
		-O0	794.1	969.1	916.0	498.1		1584.0	694.9	1186.2	948.9	948.9		
	gcc 4.1.1	-O1	1023.5	1184.9	1100.0	826.7		1623.2	1167.8	1308.9	1176.4	1176.4		
		-O2	1173.7	1314.3	1234.3	1061.3		1669.6	1462.1	1388.3	1329.1	1329.1		
		-O2 -march=pentium2	1197.4	1333.7	1242.9	1108.9		1672.6	1502.7	1467.7	1360.8	1360.8		
		-O2 -mtune=pentium2	1191.3	1335.2	1245.0	1088.1		1664.6	1512.2	1474.9	1358.8	1358.8		
		-O3	1344.0	1432.3	1544.8	1217.3		1708.5	1554.6	1610.8	1487.5	1487.5		
		-O3 -march=pentium2	1365.3	1456.1	1564.0	1260.5		1723.0	1626.9	1933.2	1561.3	1561.3		
		-O3 -mtune=pentium2	1367.0	1461.6	1566.2	1245.1		1716.5	1622.1	1935.6	1559.2	1559.2		
		-Os	1115.9	1263.4	1174.3	819.2		1641.2	1366.0	1340.2	1245.7	1245.7		
		-Os -march=pentium2	1143.6	1282.1	1192.5	857.7		1653.7	1414.3	1387.1	1275.9	1275.9		
		-Os -mtune=pentium2	1140.7	1281.6	1194.8	844.8		1649.7	1422.1	1391.9	1275.1	1275.1		
		User	cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
				-O2	125.4	126.2	134.1	128.3	133.1	109.3	132.0	127.8	126.2	
				-O3			172.0	250.2		135.1	184.9	160.0		
gcc 3.4.3	-O0		217.7	210.7	240.0	170.9	270.8	239.8	225.2	288.9	227.6	227.6		
	-O1		353.2	344.8	372.8	319.3	445.5	294.4	435.7	460.0	368.6	368.6		
	-O2		625.3	582.9	626.4	657.3	771.8	378.4	854.4	771.1	642.2	642.2		
	-O2 -march=pentium2		627.2	601.5	628.4	664.1	798.1	377.4	887.8	815.6	657.4	657.4		
	-O2 -mtune=pentium2		627.7	596.3	628.6	663.4	792.7	373.8	894.0	802.2	655.2	655.2		
	-O3		898.4	711.5	1034.7	820.0	1485.8	432.5	1177.5	924.4	857.0	857.0		
	-O3 -march=pentium2		895.3	735.5	1015.5	833.2	1496.8	461.2	1228.7	1000.0	881.3	881.3		
	-O3 -mtune=pentium2		902.0	734.6	1032.0	824.1	1485.7	446.9	1213.2	988.9	877.4	877.4		
	-Os		569.0	521.1	553.5	584.6	689.3	367.9	816.3	671.1	583.4	583.4		
	-Os -march=pentium2		583.8	538.7	564.1	596.9	731.8	362.4	855.1	700.0	600.1	600.1		
	-Os -mtune=pentium2		585.1	537.9	563.7	593.1	732.3	369.5	869.9	708.9	604.0	604.0		
	-O0		243.1	236.8	261.6	193.0		260.4	266.4	360.0	260.2	260.2		
gcc 4.1.1	-O1		582.5	606.1	562.9	600.4		397.9	864.5	582.2	599.5	599.5		
	-O2		804.6	827.5	784.5	890.7		515.6	1254.4	742.2	831.4	831.4		
	-O2 -march=pentium2		837.9	862.2	804.9	948.2		534.2	1317.3	895.6	885.8	885.8		
	-O2 -mtune=pentium2		830.8	866.7	801.5	922.4		524.2	1314.2	900.0	880.0	880.0		
	-O3		1054.8	1030.9	1295.9	1082.1		631.6	1374.0	1148.9	1088.3	1088.3		
	-O3 -march=pentium2		1086.2	1077.0	1331.9	1135.2		650.3	1466.4	1740.0	1212.4	1212.4		
	-O3 -mtune=pentium2		1088.2	1079.6	1326.4	1114.2		643.1	1470.3	1753.3	1210.7	1210.7		
	-Os		718.9	743.1	690.8	590.8		459.8	1137.9	628.9	710.0	710.0		
	-Os -march=pentium2		759.3	778.5	723.5	635.9		488.4	1194.6	744.4	760.7	760.7		
	-Os -mtune=pentium2		756.5	778.6	726.2	618.6		478.4	1207.8	717.8	754.8	754.8		
	System		cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
				-O2	181.7	189.4	181.1	198.6	185.9	181.6	186.2	160.0	182.7	182.7
				-O3			314.1	329.7		308.4	296.4	288.0		
gcc 3.4.3		-O0	575.8	662.3	654.8	617.2	670.8	251.2	257.0	264.0	468.9	468.9		
		-O1	574.5	667.8	655.7	616.9	670.3	255.4	254.4	248.0	467.5	467.5		
		-O2	575.2	666.5	656.1	619.2	670.2	246.9	264.9	264.0	470.4	470.4		
		-O2 -march=pentium2	574.8	667.0	650.4	623.1	668.3	260.9	246.6	216.0	462.7	462.7		
		-O2 -mtune=pentium2	574.2	667.7	650.9	619.3	674.6	252.8	238.7	250.7	464.9	464.9		
		-O3	575.4	669.1	657.3	622.9	671.4	251.6	259.7	256.0	470.3	470.3		
		-O3 -march=pentium2	576.5	666.3	655.0	622.5	670.4	245.3	243.9	245.3	465.0	465.0		
		-O3 -mtune=pentium2	575.9	662.2	651.8	618.5	669.8	251.6	264.9	274.7	471.4	471.4		
		-Os	572.6	665.5	650.5	619.3	669.2	244.5	251.8	253.3	465.4	465.4		
		-Os -march=pentium2	575.6	661.9	637.3	612.5	670.8	247.6	270.2	245.3	464.3	464.3		
		-Os -mtune=pentium2	572.3	662.0	654.4	618.3	668.0	253.7	215.1	256.0	461.7	461.7		
		gcc 4.1.1	-O0	112.8	133.5	166.8	162.6		236.3	223.0	253.3	184.0	184.0	
-O1			112.9	134.1	162.7	166.7		230.6	238.7	240.0	183.7	183.7		
-O2			113.1	136.2	167.7	168.9		247.6	267.5	250.7	193.1	193.1		
-O2 -march=pentium2			112.8	138.3	166.4	174.9		235.8	259.7	272.0	194.3	194.3		
-O2 -mtune=pentium2			114.4	133.3	166.1	170.7		232.7	251.8	261.3	190.0	190.0		
-O3			114.3	136.0	166.9	171.2		235.8	246.6	258.7	189.9	189.9		
-O3 -march=pentium2			115.2	138.6	167.4	173.9		233.5	243.9	261.3	190.6	190.6		
-O3 -mtune=pentium2			114.9	137.4	171.3	174.2		242.9	241.3	272.0	193.4	193.4		
-Os			110.8	130.1	164.3	166.1		237.4	246.6	237.3	184.6	184.6		
-Os -march=pentium2			111.6	130.5	164.3	166.8		235.8	243.9	234.7	183.9	183.9		
-Os -mtune=pentium2			112.1	133.3	166.4	167.5		228.8	251.8	245.3	186.4	186.4		

Used color scale

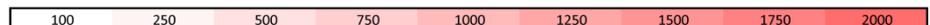


Figure 3 - Compilation time indexed to cc -O1 at 100 (Pentium 2 350MHz)

Pentium 3 1GHz - Compilation time (indexed to cc -O1 at 100)													
Compiler executions			python	gzip	bc	bzip2	awk	sorting	sed	whetstone	AVERAGE excl. awk		
Total source size (code + headers)			2028.85 kB	250.42 kB	194.20 kB	238.65 kB	104.30 kB	7.88 kB	45.04 kB	7.93 kB	19.75		
Time	Compiler	Optimization parameters									359.66 kB		
Real	cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
		-O2	156.1	164.8	161.9	149.1	166.7	165.7	151.3	154.9	157.7		
		-O3			266.7	260.1			282.3	237.9	255.6		
	gcc 3.4.3	-O0	467.8	541.3	540.3	382.1	571.9	997.9	615.3	865.1	630.0		
		-O1	530.9	587.9	591.3	481.8	633.4	1010.6	729.9	922.2	693.5		
		-O2	652.4	666.6	685.3	717.1	740.9	1015.0	977.4	1031.5	820.8		
		-O2 -march=pentium3	657.0	673.3	685.1	719.1	750.2	1017.1	1001.5	1037.0	827.2		
		-O2 -mtune=pentium3	653.0	670.8	684.1	721.5	749.0	1009.5	1002.6	1046.3	826.8		
		-O3	779.5	713.2	851.7	840.2	998.1	1036.6	1199.7	1074.6	927.9		
		-O3 -march=pentium3	782.7	722.2	842.1	844.6	999.2	1030.6	1227.2	1096.3	935.1		
		-O3 -mtune=pentium3	780.1	719.6	847.5	838.6	997.9	1029.5	1237.5	1101.9	936.4		
		-Os	626.6	645.2	656.2	667.3	713.1	1022.7	951.0	1000.0	795.6		
		-Os -march=pentium3	635.6	653.2	661.6	671.1	729.2	1023.0	986.6	1009.3	805.8		
		-Os -mtune=pentium3	633.7	650.1	660.9	670.3	726.3	1018.2	990.0	1001.9	803.6		
		-O0	971.1	1110.3	1058.1	697.0		1496.2	869.7	1266.7	1067.0		
	gcc 4.1.1	-O1	1129.0	1250.4	1181.5	993.1		1515.6	1244.4	1320.4	1233.5		
		-O2	1231.5	1330.1	1268.1	1180.5		1536.7	1455.2	1368.5	1338.7		
		-O2 -march=pentium3	1247.5	1338.7	1273.6	1215.3		1540.2	1486.1	1435.2	1362.4		
		-O2 -mtune=pentium3	1245.4	1337.8	1272.7	1206.2		1538.0	1483.0	1440.7	1360.6		
		-O3	1349.5	1404.3	1472.1	1309.1		1553.1	1542.3	1531.7	1451.7		
		-O3 -march=pentium3	1367.4	1416.3	1480.5	1346.5		1559.7	1582.2	1727.8	1497.2		
		-O3 -mtune=pentium3	1366.8	1416.3	1479.1	1334.9		1562.4	1590.4	1731.5	1497.3		
		-Os	1192.3	1300.3	1224.9	977.8		1519.9	1394.6	1342.6	1278.9		
		-Os -march=pentium3	1210.9	1306.8	1239.6	1005.6		1530.8	1431.1	1382.5	1301.1		
		-Os -mtune=pentium3	1209.3	1307.1	1237.6	997.7		1529.3	1420.8	1366.7	1295.5		
		User	cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
				-O2	126.6	124.6	129.5	128.1	140.0	109.8	132.1	118.8	124.2
	-O3					176.7	219.4			139.1	191.6	190.0	
gcc 3.4.3	-O0		228.7	214.5	242.7	191.6	281.9	254.3	230.6	293.0	236.5		
	-O1		361.0	345.8	366.3	347.4	443.3	278.9	437.6	422.2	365.6		
	-O2		617.9	567.9	600.6	716.1	737.3	372.8	841.8	698.7	630.8		
	-O2 -march=pentium3		626.3	578.2	600.2	725.1	760.0	374.1	885.1	733.9	646.1		
	-O2 -mtune=pentium3		620.6	571.7	595.0	725.5	760.2	353.0	897.0	703.7	638.1		
	-O3		884.9	692.1	1009.5	910.7	1425.0	429.8	1236.0	883.2	863.8		
	-O3 -march=pentium3		892.7	710.9	988.7	923.6	1429.1	446.2	1285.3	889.7	876.7		
	-O3 -mtune=pentium3		888.3	699.7	997.9	911.0	1431.8	437.0	1296.0	950.0	882.8		
	-Os		563.8	503.6	530.6	641.9	658.6	332.1	814.2	598.1	569.2		
	-Os -march=pentium3		583.7	518.3	542.0	650.5	703.1	355.5	847.7	618.3	588.0		
	-Os -mtune=pentium3		578.6	517.0	538.2	647.7	693.6	337.6	857.5	623.3	585.7		
	-O0		258.1	241.5	263.2	216.6		273.6	272.0	321.7	263.8		
gcc 4.1.1	-O1		595.5	631.0	570.1	685.9		407.2	934.4	512.7	619.6		
	-O2		815.3	852.8	783.2	980.1		487.0	1301.1	698.7	845.5		
	-O2 -march=pentium3		848.6	886.9	804.4	1034.2		549.2	1362.2	834.4	902.9		
	-O2 -mtune=pentium3		844.6	885.4	792.4	1022.1		507.2	1367.0	829.4	892.6		
	-O3		1063.8	1048.6	1277.5	1185.2		588.7	1464.7	1085.7	1102.0		
	-O3 -march=pentium3		1101.7	1109.3	1317.2	1239.8		673.8	1525.8	1648.7	1230.9		
	-O3 -mtune=pentium3		1100.8	1096.7	1318.0	1222.3		634.1	1539.6	1673.8	1226.5		
	-Os		733.1	761.0	688.7	661.5		454.7	1192.9	557.9	721.4		
	-Os -march=pentium3		774.0	801.6	717.6	701.3		490.9	1247.8	710.9	777.7		
	-Os -mtune=pentium3		770.7	793.3	710.4	689.2		462.1	1243.9	683.6	764.7		
	System		cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
				-O2	182.8	188.3	184.6	186.5	183.6	178.9	180.5	177.0	182.7
-O3						330.2	332.4			317.1	311.4	297.5	
gcc 3.4.3		-O0	689.0	736.9	751.6	720.2	755.5	176.7	194.6	207.4	496.6		
		-O1	689.9	737.2	753.4	725.2	757.4	177.5	189.0	197.2	495.6		
		-O2	689.4	733.8	752.0	727.5	756.0	174.8	183.3	191.2	493.1		
		-O2 -march=pentium3	690.8	738.7	751.7	718.0	743.7	183.5	186.2	209.1	496.9		
		-O2 -mtune=pentium3	688.7	738.1	754.0	724.1	756.0	176.5	183.3	185.2	492.9		
		-O3	691.4	735.4	754.7	727.1	759.1	183.1	194.6	174.1	494.4		
		-O3 -march=pentium3	689.0	739.0	752.0	717.2	759.6	176.1	169.2	188.2	490.1		
		-O3 -mtune=pentium3	688.6	742.4	756.0	721.3	756.4	179.6	171.6	179.2	491.3		
		-Os	689.7	737.0	750.1	720.7	745.1	178.9	189.0	197.2	494.6		
		-Os -march=pentium3	687.8	740.2	741.1	716.1	756.6	177.6	189.0	179.2	490.1		
		-Os -mtune=pentium3	690.0	737.2	753.4	719.6	758.1	178.8	189.0	185.2	493.3		
		-O0	82.6	99.2	131.0	132.0		171.3	174.9	182.2	139.0		
gcc 4.1.1		-O1	83.9	101.6	134.6	135.6		167.0	169.2	200.2	141.7		
		-O2	84.5	97.7	132.0	137.7		172.6	172.1	188.2	140.7		
		-O2 -march=pentium3	84.3	97.8	131.1	137.5		175.5	180.5	188.2	142.1		
		-O2 -mtune=pentium3	83.3	98.2	131.2	137.4		153.4	166.8	179.2	135.7		
		-O3	84.2	100.3	134.6	135.2		171.3	183.3	171.6	140.1		
		-O3 -march=pentium3	85.7	98.6	133.9	139.1		167.3	164.4	191.2	140.0		
		-O3 -mtune=pentium3	85.3	98.3	132.9	137.5		181.6	169.2	179.2	140.6		
		-Os	84.8	100.1	127.7	135.6		168.2	169.2	191.2	139.5		
		-Os -march=pentium3	84.9	97.0	131.4	134.6		168.9	194.6	161.3	139.0		
		-Os -mtune=pentium3	83.8	99.6	131.6	138.0		174.1	177.7	191.2	142.3		

Used color scale

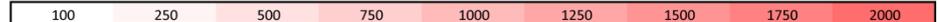


Figure 4 - Compilation time indexed to cc -O1 at 100 (Pentium 3 1GHz)

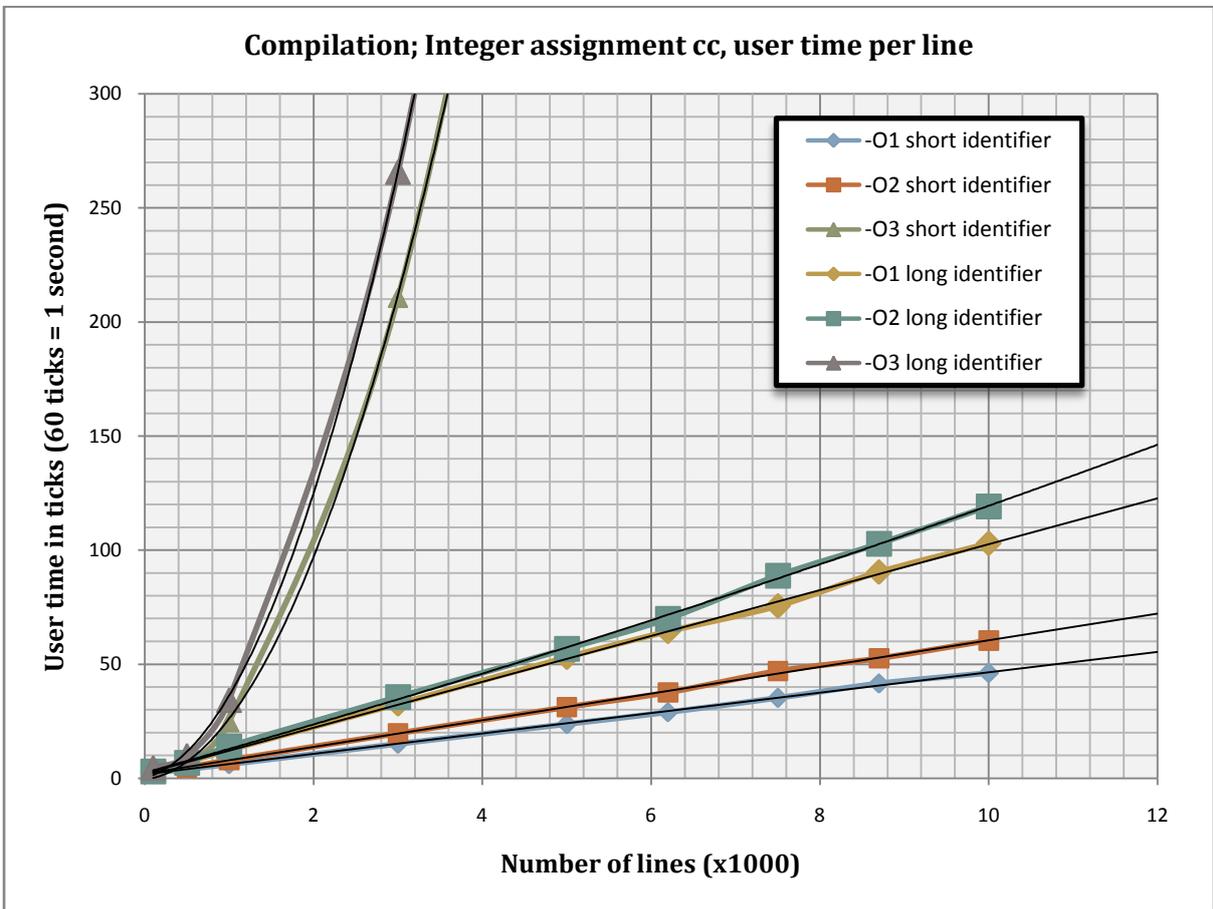


Figure 5 - Compilation user time per line, integer assignment cc (Pentium 2 350MHz)

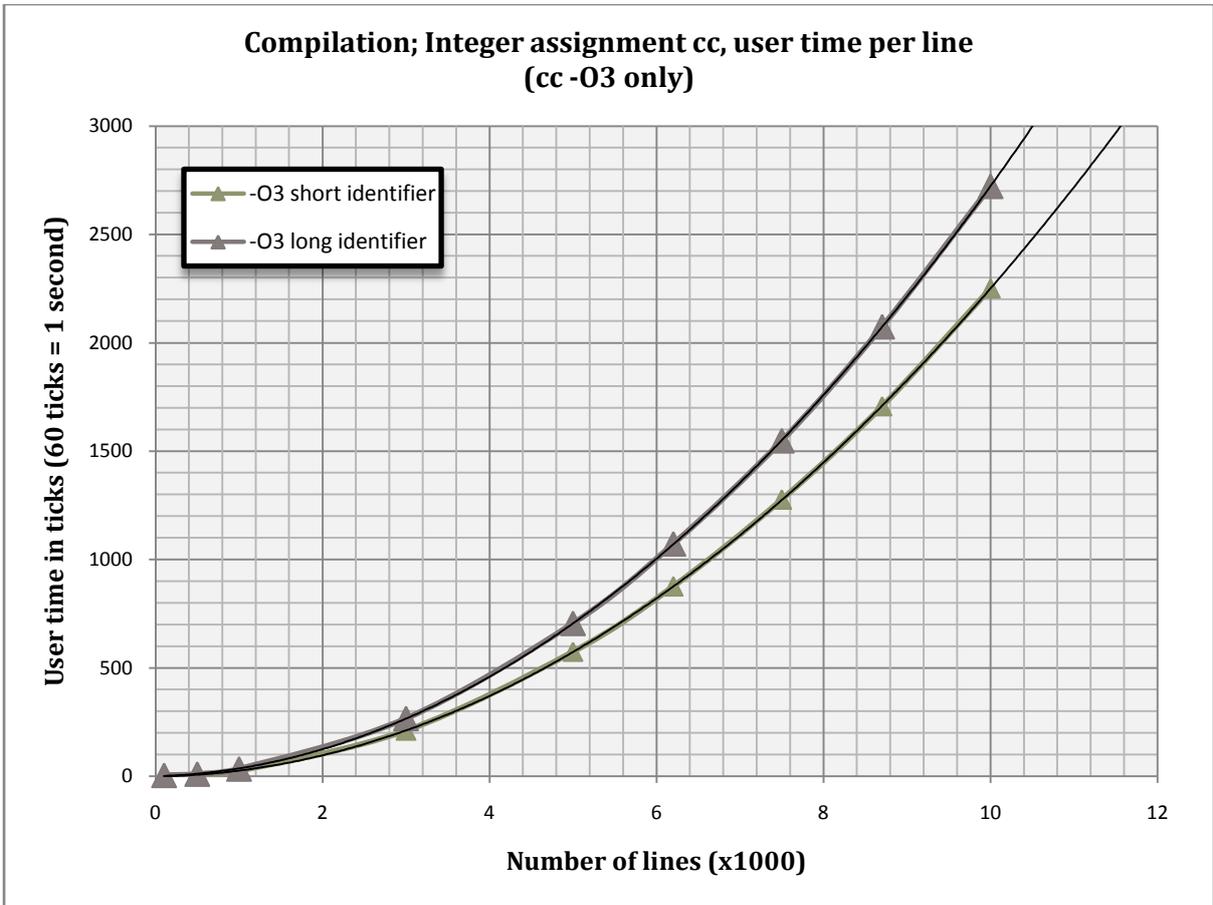


Figure 6 - Compilation user time per line, integer assignment cc -O3 (Pentium 2 350MHz)

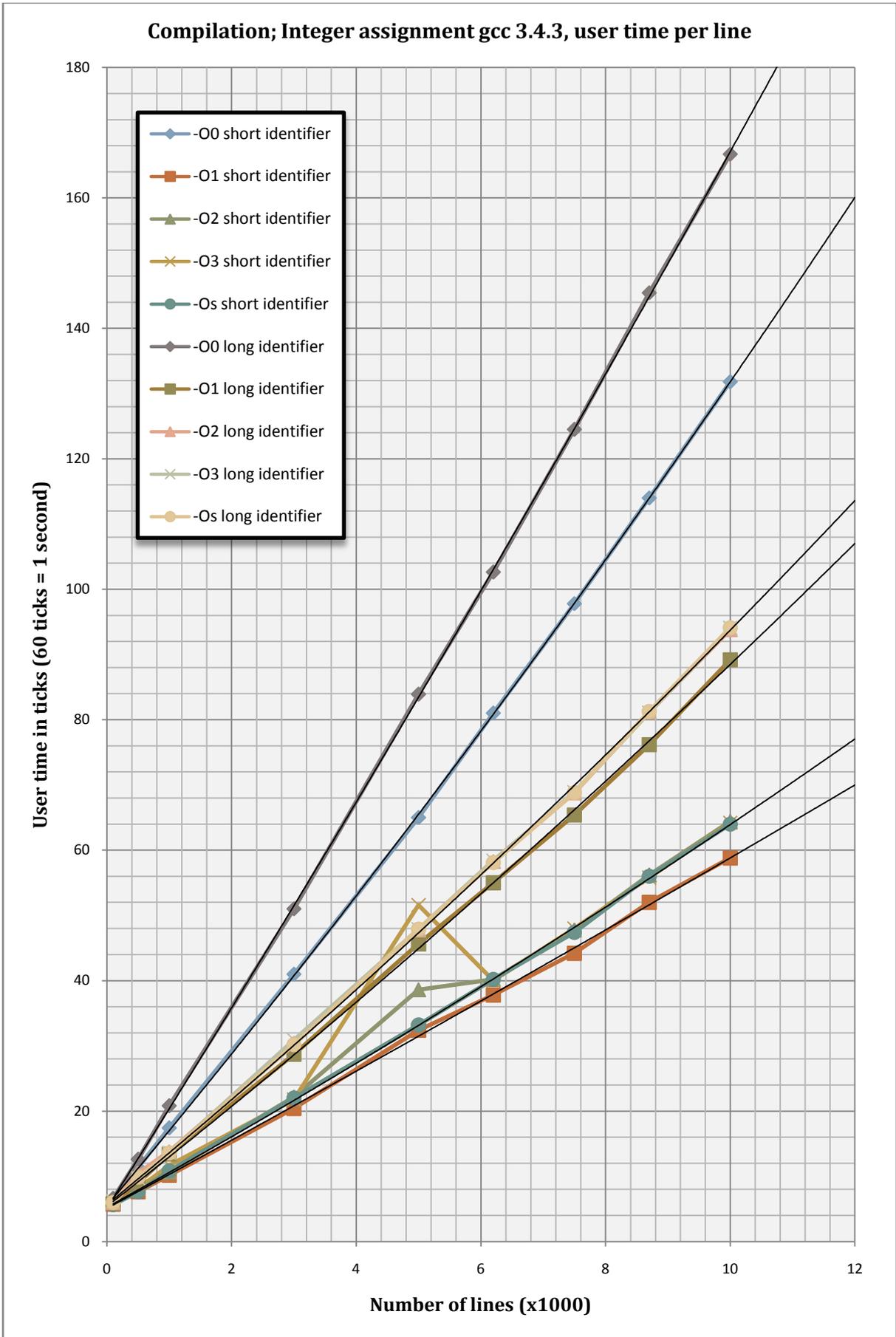


Figure 7 - Compilation user time per line, integer assignment gcc 3.4.3 (Pentium 2 350MHz)

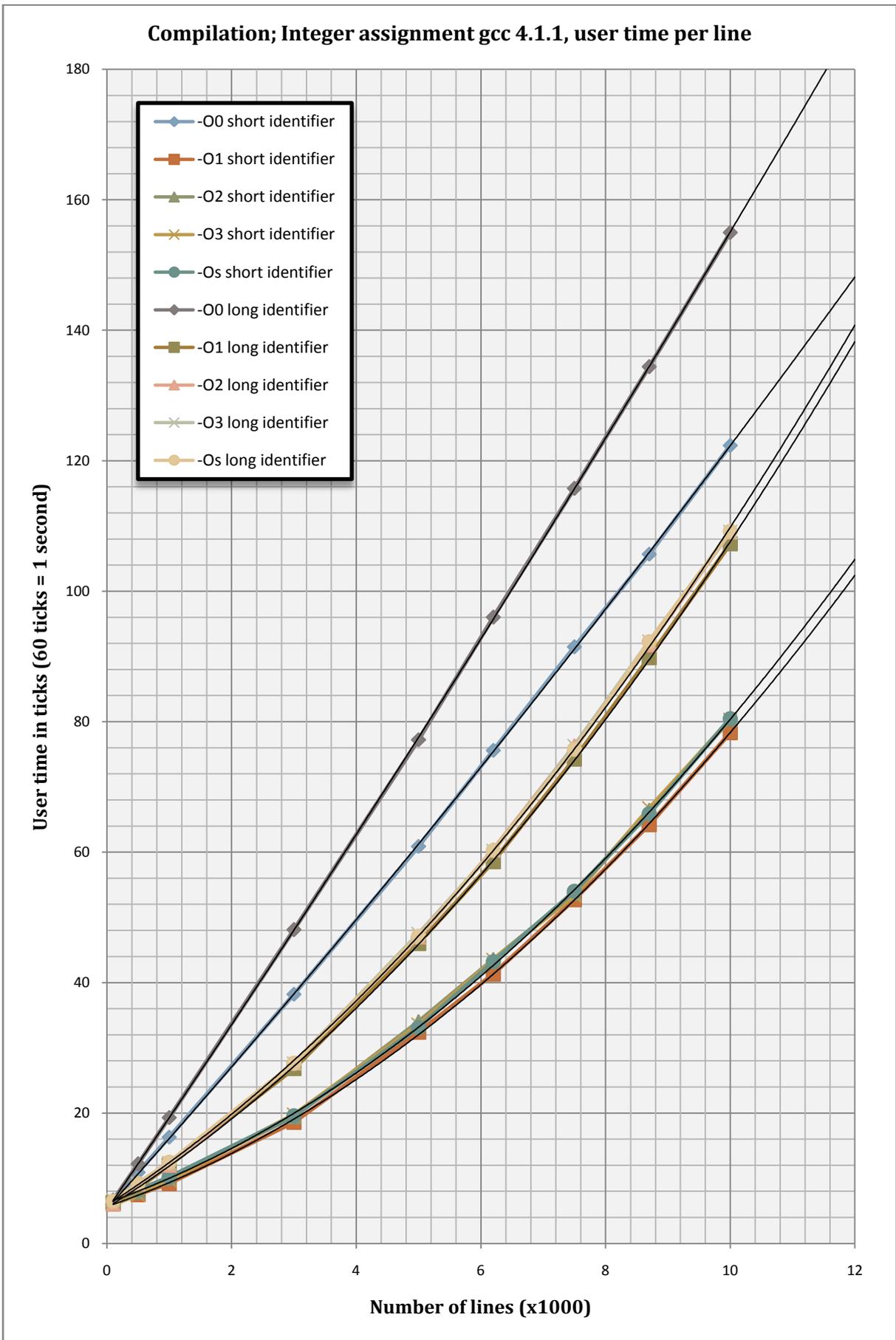


Figure 8 - Compilation user time per line, integer assignment gcc 4.1.1 (Pentium 2 350MHz)

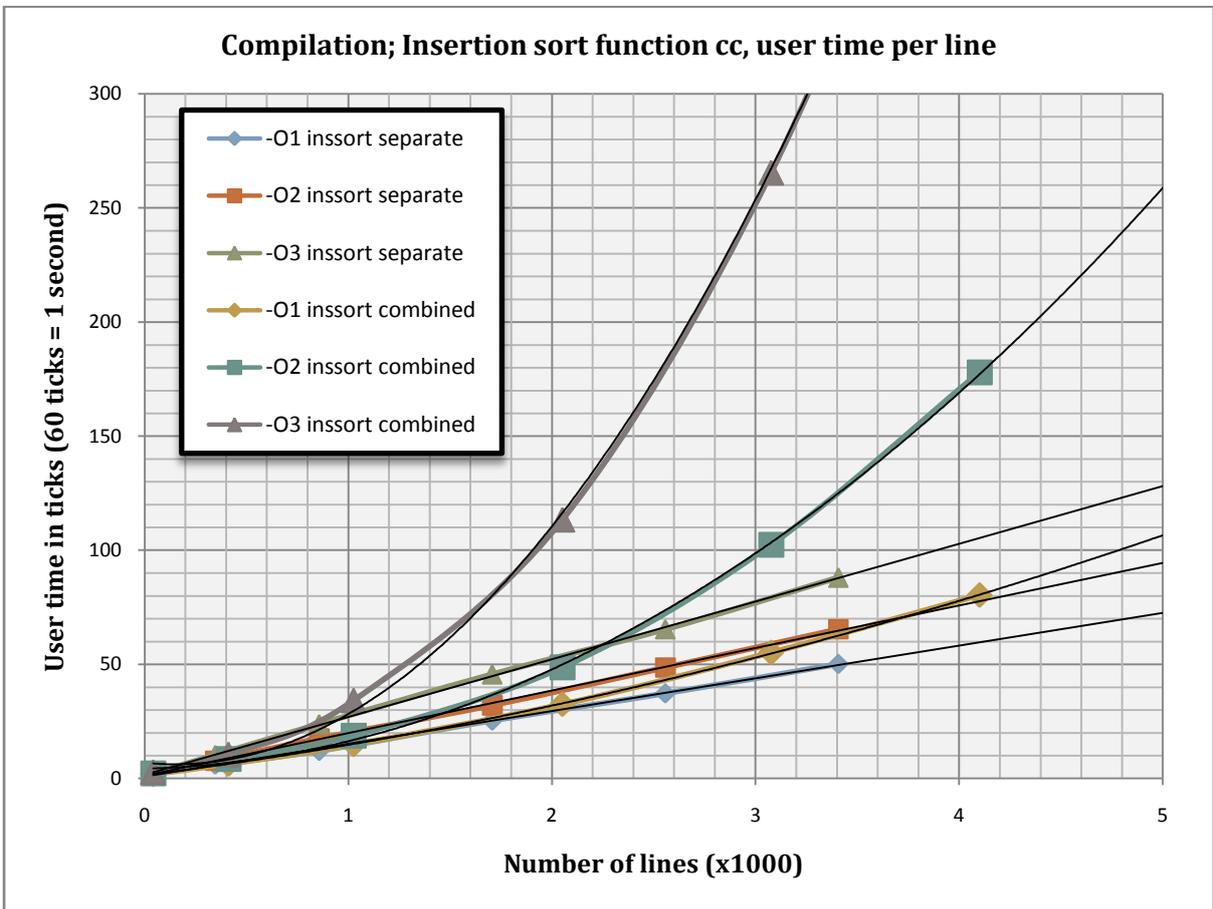


Figure 9 - Compilation user time per line, insertion sort cc (Pentium 2 350MHz)

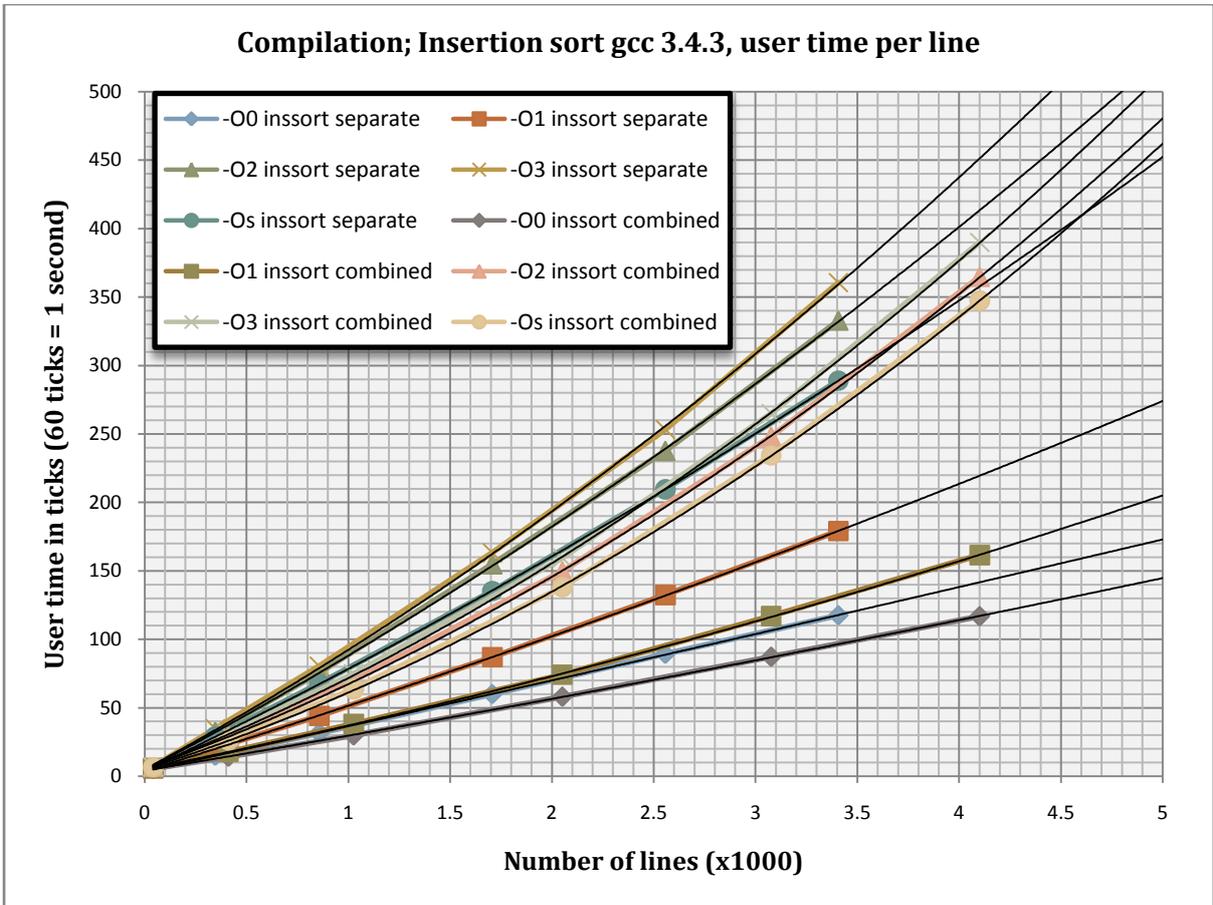


Figure 10 - Compilation user time per line, insertion sort gcc 3.4.3 (Pentium 2 350MHz)

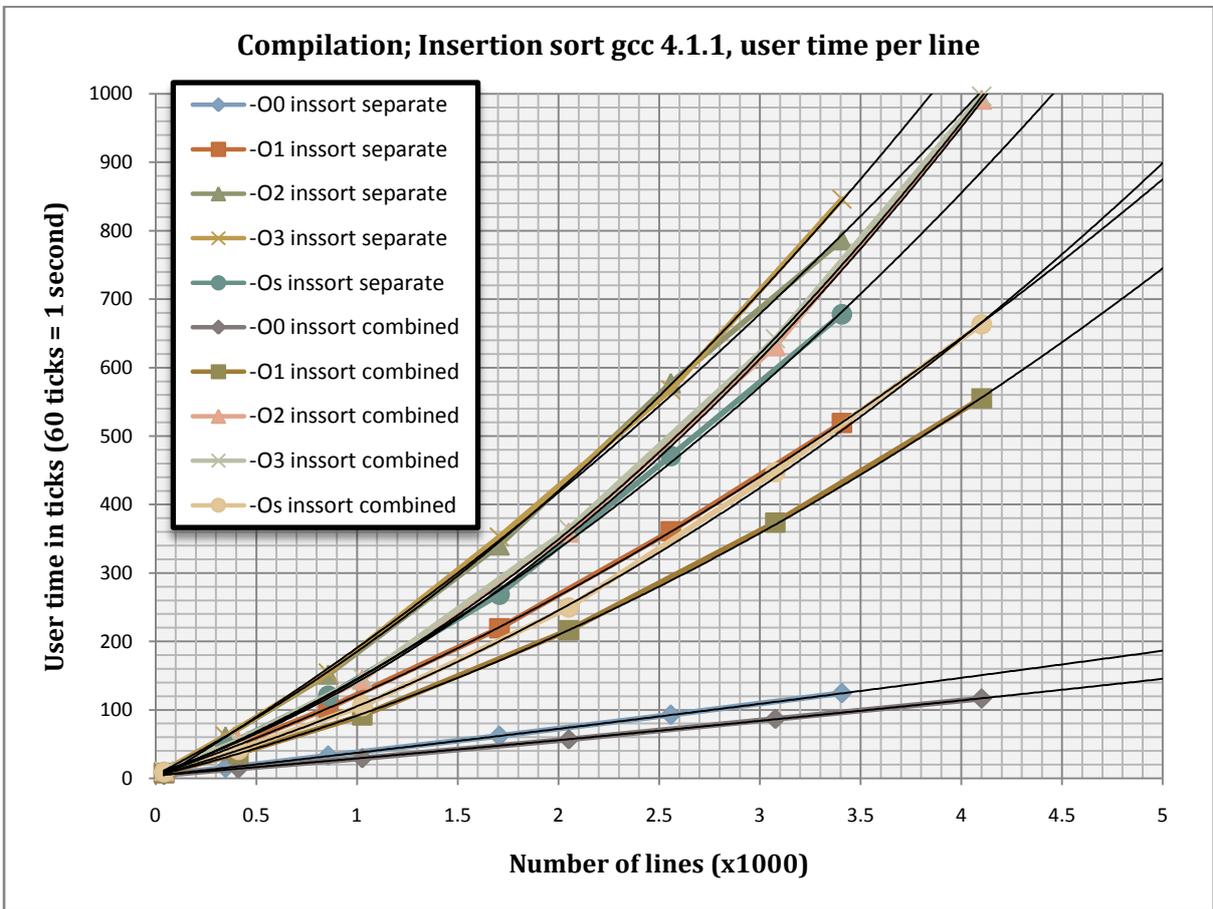


Figure 11 - Compilation user time per line, insertion sort gcc 4.1.1 (Pentium 2 350MHz)

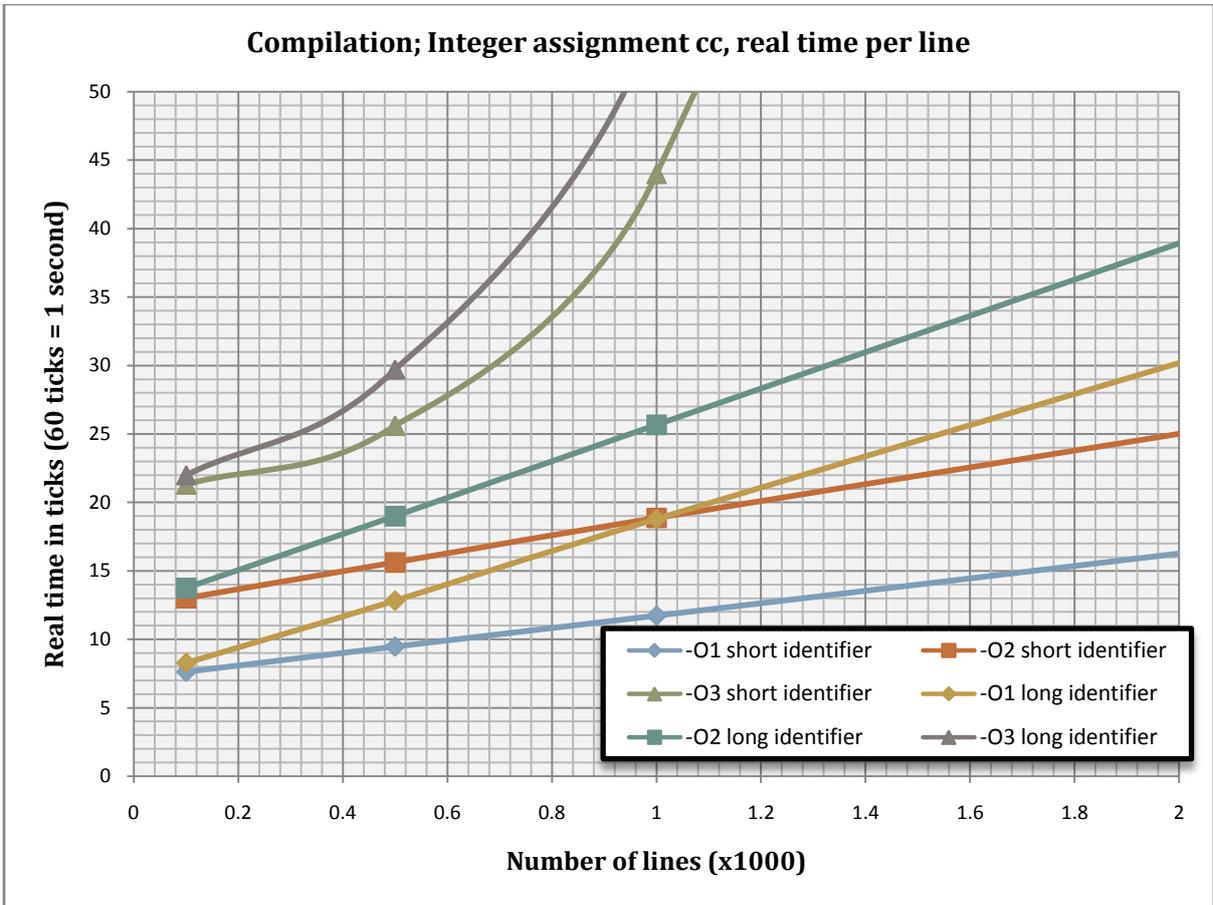


Figure 12 - Compilation real time per line, integer assignment cc (Pentium 2 350MHz)

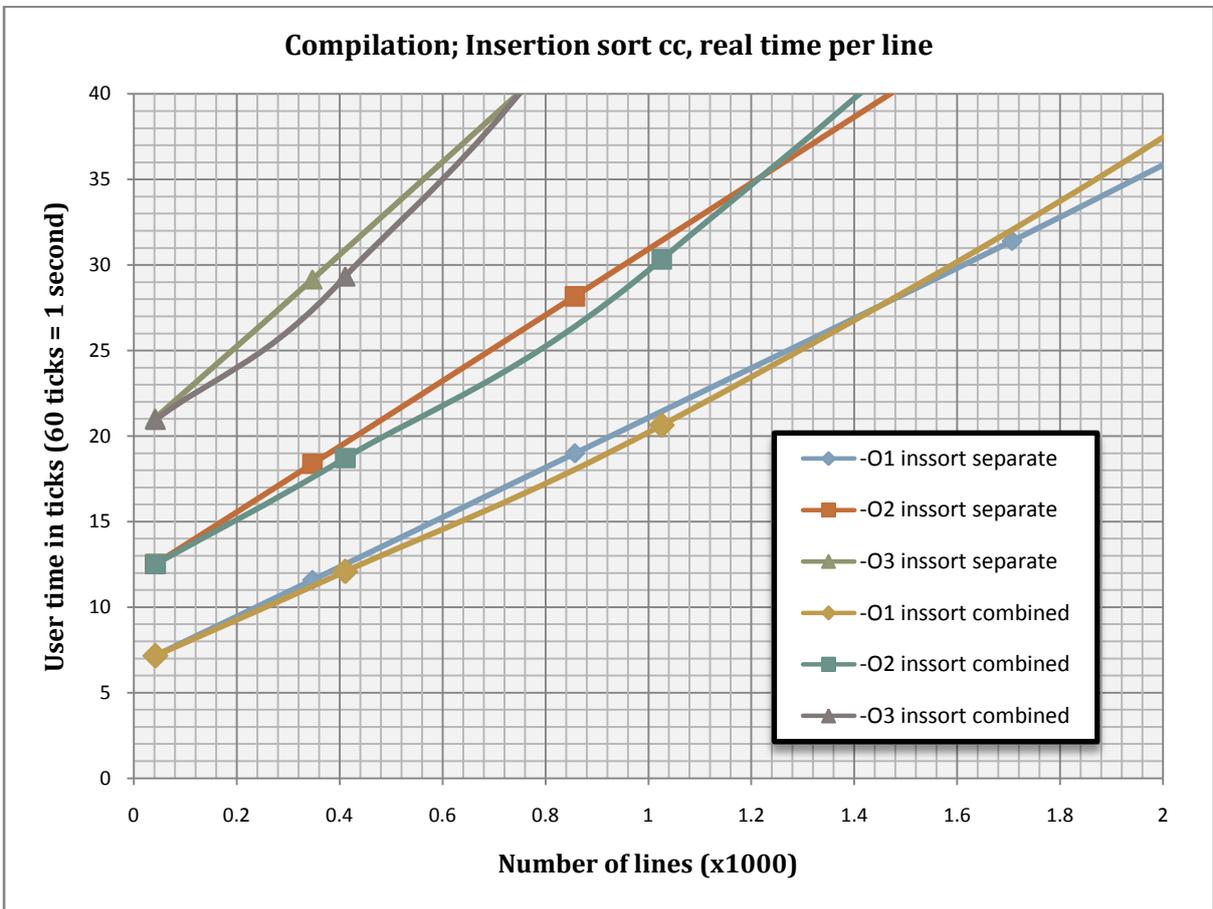


Figure 13 - Compilation real time per line, insertion sort cc (Pentium 2 350MHz)

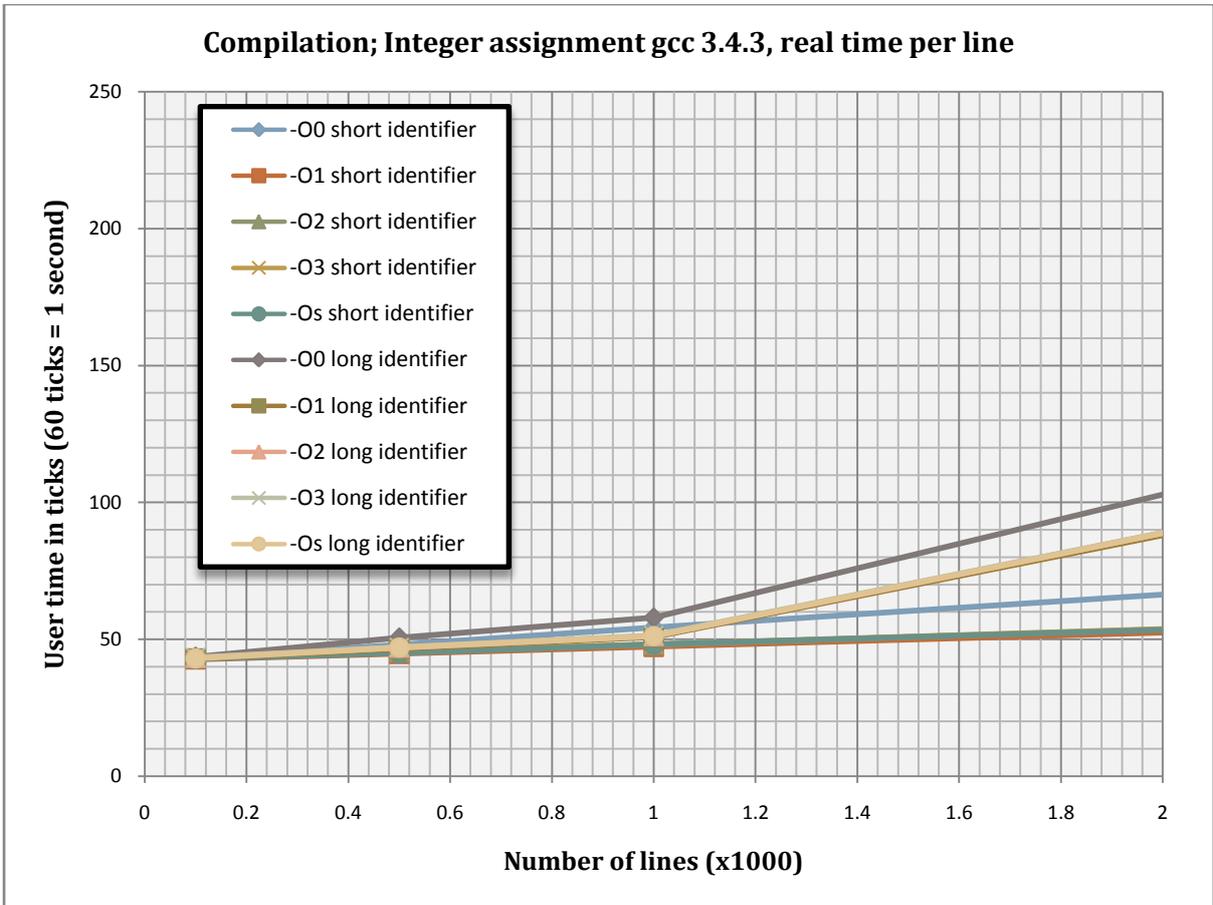


Figure 14 - Compilation real time per line, integer assignment gcc 3.4.3 (Pentium 2 350MHz)

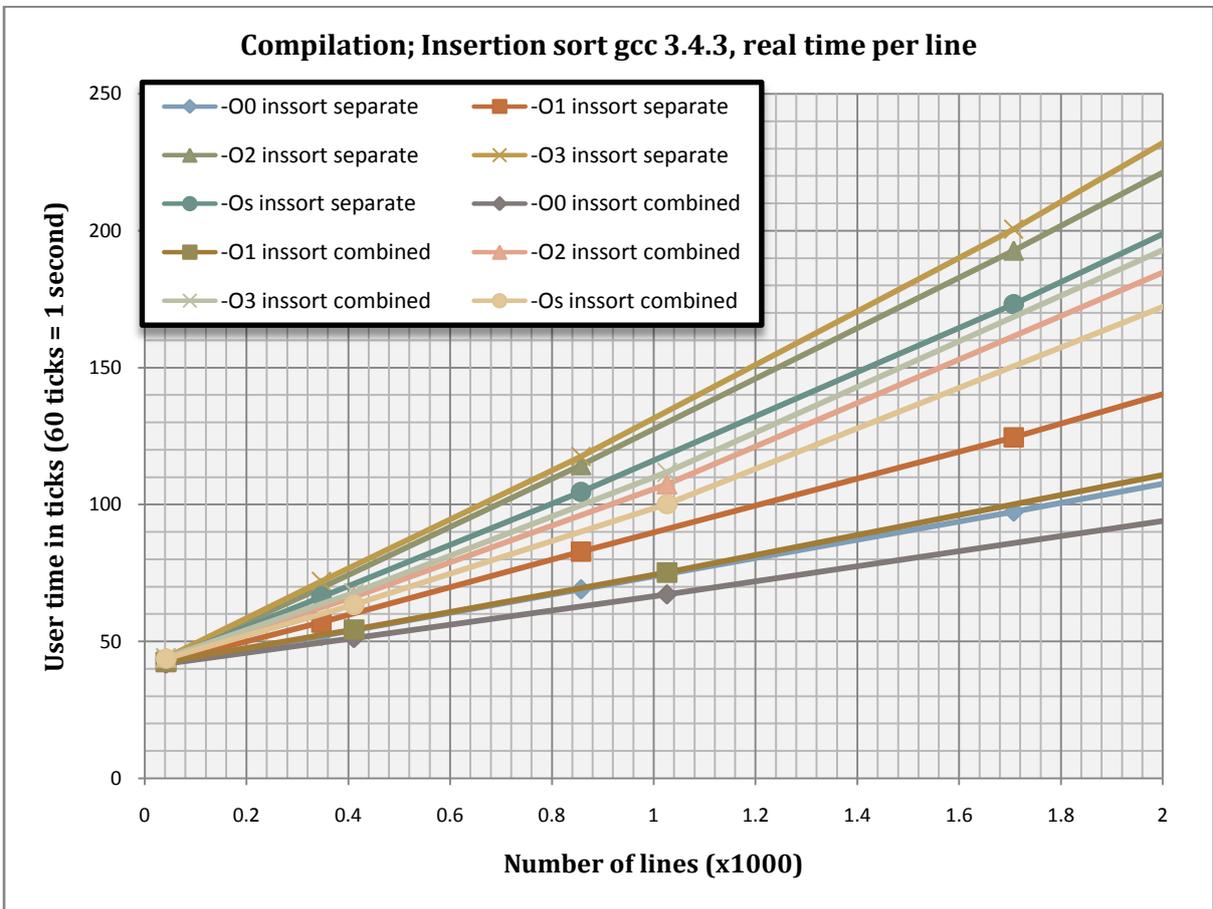


Figure 15 - Compilation real time per line, insertion sort gcc 3.4.3 (Pentium 2 350MHz)

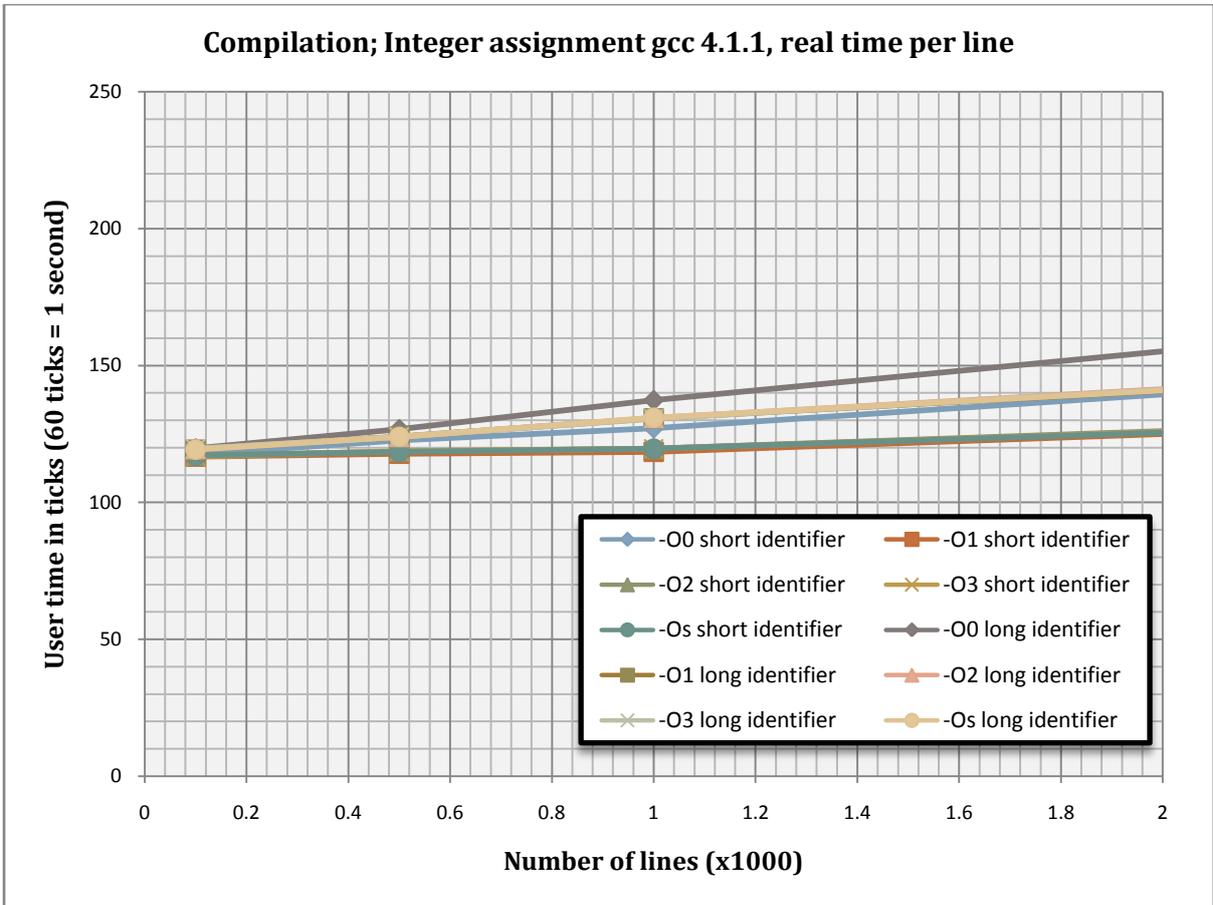


Figure 16 - Compilation real time per line, integer assignment gcc 4.1.1 (Pentium 2 350MHz)

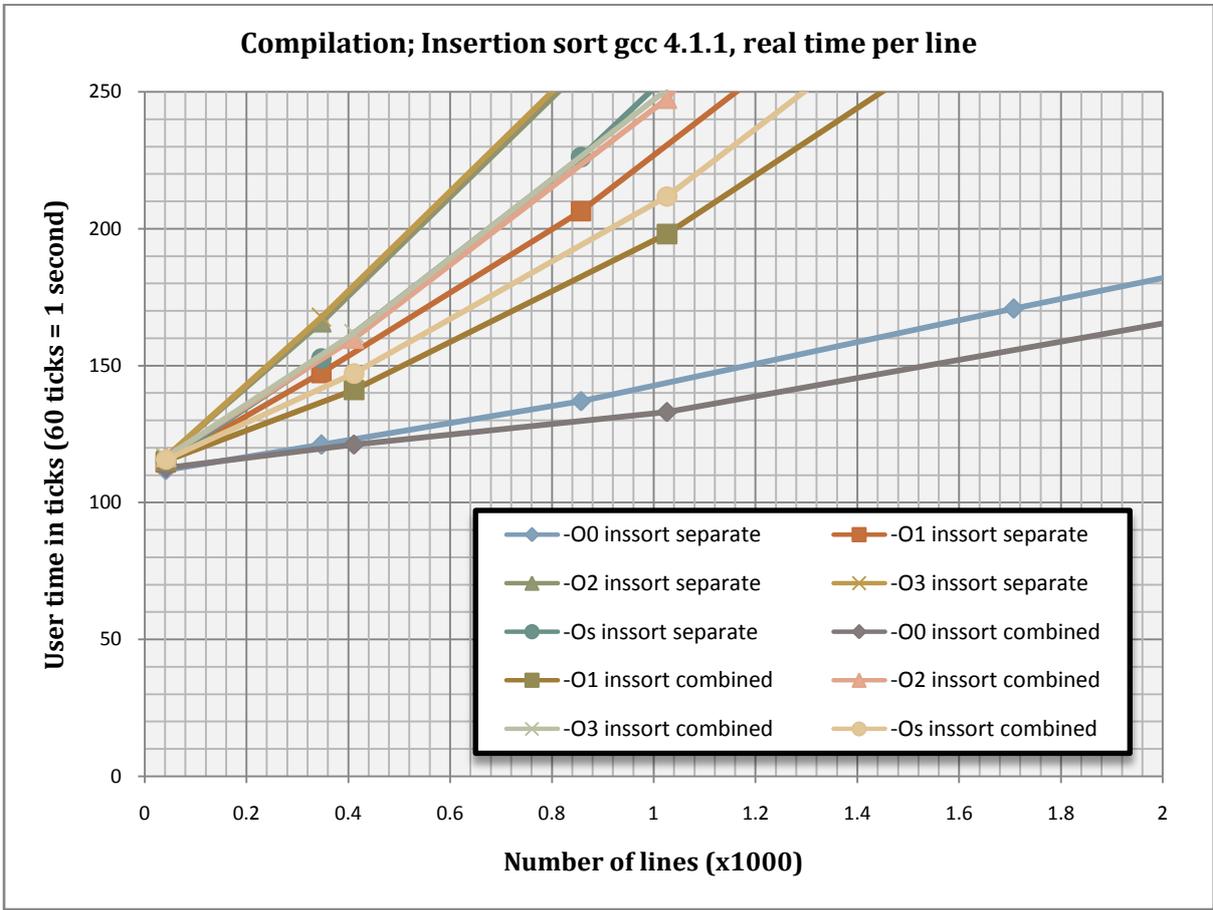


Figure 17 - Compilation real time per line, insertion sort gcc 4.1.1 (Pentium 2 350MHz)

# Size

Segment sizes in bytes											
Compiler executions			python	gzip	bc	bzip2	awk	sorting	sed	whetstone	
Total source size (code + headers)			104 2028.85 kB	15 250.42 kB	12 194.20 kB	11 238.65 kB	10 104.30 kB	4 7.88 kB	1 45.04 kB	1 7.93 kB	
Time	Compiler	Optimization parameters									
Text	cc	-O1	396,528	48,944	37,696	89,072	55,440	3,280	17,440	24,400	
		-O2	385,648	48,384	36,176	86,752	54,272	3,280	16,960	24,368	
	gcc 3.4.3	-O3			36,208	86,304		3,632	16,944	24,336	
		-O0	514,560	63,712	54,488	92,936	63,736	5,048	28,944	25,032	
		-O1	404,920	56,688	47,416	75,800	55,856	4,032	27,024	24,096	
		-O2	410,464	57,216	45,696	80,584	54,824	4,048	26,584	24,024	
		-O2 -march=pentium2	444,424	60,144	48,688	82,400	58,512	4,272	27,496	25,432	
		-O2 -march=pentium3	444,336	60,144	48,688	82,248	58,528	4,272	27,496	25,040	
		-O2 -mtune=pentium2	444,472	60,080	48,672	82,432	58,464	4,272	27,496	25,432	
		-O3	522,512	63,288	57,848	83,056	75,952	4,512	27,992	24,848	
		-O3 -march=pentium2	564,856	66,576	60,544	86,016	79,168	4,720	29,032	26,376	
		-O3 -march=pentium3	565,648	66,576	60,512	85,960	79,168	4,720	29,032	26,000	
	gcc 4.1.1	-O3 -mtune=pentium2	565,464	66,720	60,688	85,488	79,392	4,720	29,032	26,344	
		-Os	350,392	52,384	41,032	69,528	50,000	3,840	25,192	23,736	
		-Os -march=pentium2	355,024	52,792	41,272	70,320	50,504	3,840	25,464	23,984	
		-Os -march=pentium3	354,720	52,792	41,272	70,232	50,504	3,840	25,464	23,608	
		-Os -mtune=pentium2	354,544	52,784	41,336	70,352	50,472	3,840	25,448	23,984	
		-O0	540,896	65,808	55,696	95,240		4,640	30,256	26,176	
		-O1	407,544	56,616	47,128	78,136		4,240	26,448	24,176	
		-O2	413,408	58,152	47,200	77,552		4,376	26,800	24,208	
		-O2 -march=pentium2	444,208	60,296	49,176	80,320		4,544	27,632	25,440	
		-O2 -march=pentium3	444,224	60,312	49,176	80,240		4,544	27,632	25,440	
	gcc 4.1.1	-O2 -mtune=pentium2	444,800	60,312	49,288	80,368		4,544	27,584	25,440	
		-O3	509,400	67,976	61,152	83,360		4,832	26,632	26,720	
		-O3 -march=pentium2	539,792	69,544	63,128	86,080		5,024	27,760	29,376	
		-O3 -march=pentium3	539,536	69,576	63,128	86,000		5,024	27,760	29,376	
		-O3 -mtune=pentium2	540,352	69,848	63,128	86,112		5,024	27,792	29,376	
		-Os	351,200	52,560	41,384	61,368		3,960	25,064	23,760	
		-Os -march=pentium2	351,912	52,600	41,384	61,408		3,960	25,016	23,904	
		-Os -march=pentium3	351,808	52,600	41,384	61,384		3,960	25,016	23,928	
		-Os -mtune=pentium2	351,920	52,560	41,408	61,368		3,960	25,016	23,904	
		Data	cc	-O1	153,044	11,428	14,860	18,436	9,340	112	2,184
	-O2			153,044	11,428	14,860	18,436	9,340	112	2,184	3,316
	gcc 3.4.3		-O3			14,860	18,436		112	2,184	3,316
			-O0	147,080	12,560	16,152	17,088	7,240	256	3,944	2,944
			-O1	146,984	12,560	16,144	17,080	7,240	256	3,944	2,944
			-O2	147,280	12,696	15,976	17,080	7,160	256	3,944	2,944
			-O2 -march=pentium2	147,080	12,688	15,976	17,080	7,192	256	3,944	2,944
			-O2 -march=pentium3	147,048	12,688	15,976	17,080	7,192	256	3,944	2,944
			-O2 -mtune=pentium2	147,080	12,688	15,976	17,080	7,160	256	3,944	2,944
-O3			150,712	12,664	15,976	17,032	7,216	256	3,944	2,944	
-O3 -march=pentium2			150,448	12,656	15,976	17,040	7,248	256	3,944	2,944	
-O3 -march=pentium3			150,416	12,656	15,976	17,040	7,248	256	3,944	2,944	
gcc 4.1.1	-O3 -mtune=pentium2		150,448	12,656	15,976	17,040	7,216	256	3,944	2,944	
	-Os		139,720	12,560	15,336	16,680	6,072	256	3,560	2,944	
	-Os -march=pentium2		139,720	12,560	15,336	16,680	6,104	256	3,560	2,944	
	-Os -march=pentium3		139,720	12,560	15,336	16,680	6,104	256	3,560	2,944	
	-Os -mtune=pentium2		139,720	12,560	15,336	16,680	6,072	256	3,560	2,944	
	-O0		147,080	12,560	16,144	17,088		256	3,944	2,944	
	-O1		147,136	12,688	16,016	17,072		256	3,912	2,944	
	-O2		147,136	12,688	16,016	17,072		256	3,912	2,944	
	-O2 -march=pentium2		146,928	12,688	16,016	17,072		256	3,912	2,944	
	-O2 -march=pentium3		146,928	12,688	16,016	17,072		256	3,912	2,944	
gcc 4.1.1	-O2 -mtune=pentium2		146,928	12,688	16,016	17,072		256	3,912	2,944	
	-O3		154,112	12,688	16,008	17,040		256	3,912	2,944	
	-O3 -march=pentium2		153,584	12,688	16,008	17,040		256	3,912	2,944	
	-O3 -march=pentium3		153,584	12,688	16,008	17,040		256	3,912	2,944	
	-O3 -mtune=pentium2		153,584	12,688	16,008	17,040		256	3,912	2,944	
	-Os		139,728	12,560	15,368	16,672		256	3,528	2,944	
	-Os -march=pentium2		139,696	12,560	15,368	16,672		256	3,528	2,944	
	-Os -march=pentium3		139,696	12,560	15,368	16,672		256	3,528	2,952	
	-Os -mtune=pentium2		139,696	12,560	15,368	16,672		256	3,528	2,944	
	BSS		cc	-O1	12,672	329,488	3,552	4,600	11,956	3,408,416	48,200
-O2				12,672	329,488	3,552	4,600	11,956	3,408,416	48,200	368
gcc 3.4.3			-O3			3,552	4,600		3,408,416	48,200	368
			-O0	15,256	330,712	4,632	4,936	12,728	3,408,480	48,792	504
			-O1	15,256	330,712	4,632	4,936	12,728	3,408,480	48,792	504
			-O2	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504
			-O2 -march=pentium2	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504
			-O2 -march=pentium3	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504
			-O2 -mtune=pentium2	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504
		-O3	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504	
		-O3 -march=pentium2	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504	
		-O3 -march=pentium3	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504	
gcc 4.1.1		-O3 -mtune=pentium2	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504	
		-Os	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504	
		-Os -march=pentium2	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504	
		-Os -march=pentium3	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504	
		-Os -mtune=pentium2	15,256	330,712	4,632	4,936	12,712	3,408,480	48,792	504	
		-O0	15,256	330,712	4,632	4,936		3,408,480	48,792	504	
		-O1	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-O2	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-O2 -march=pentium2	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-O2 -march=pentium3	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
gcc 4.1.1		-O2 -mtune=pentium2	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-O3	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-O3 -march=pentium2	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-O3 -march=pentium3	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-O3 -mtune=pentium2	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-Os	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-Os -march=pentium2	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-Os -march=pentium3	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-Os -mtune=pentium2	15,240	330,712	4,632	4,936		3,408,480	48,792	504	
		-Os	15,240	330,712	4,632	4,936		3,408,480	48,792	504	

Figure 18 - Segment sizes in bytes

Segment sizes (indexed to cc -O1 at 100)												
Compiler executions			python	gzip	bc	bzip2	awk	sorting	sed	whetstone	AVERAGE (excl. awk)	
Total source size (code + headers)			2028.85 kB	250.42 kB	194.20 kB	238.65 kB	104.30 kB	7.88 kB	45.04 kB	7.93 kB	359.66 kB	
Time	Compiler	Optimization parameters										
Text	cc	-O1	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
		-O2	97.26	98.86	95.97	97.40	97.89	100.00	97.25	99.87	98.08	
		-O3			96.05	96.89	110.73	97.16	99.74			
	gcc 3.4.3	-O0	129.77	130.17	144.55	104.34	114.96	153.90	165.96	102.59	133.04	
		-O1	102.12	115.82	125.79	85.10	100.75	122.93	154.95	98.75	115.07	
		-O2	103.51	116.90	121.22	90.47	98.89	123.41	152.43	98.46	115.20	
		-O2 -march=pentium2	112.08	122.88	129.16	92.51	105.54	130.24	157.66	104.23	121.25	
		-O2 -march=pentium3	112.06	122.88	129.16	92.34	105.57	130.24	157.66	102.62	121.00	
		-O2 -mtune=pentium2	112.09	122.75	129.12	92.55	105.45	130.24	157.66	104.23	121.23	
		-O3	131.77	129.31	153.46	93.25	137.00	137.56	160.50	101.84	129.67	
		-O3 -march=pentium2	142.45	136.02	160.61	96.57	142.80	143.90	166.47	108.10	136.30	
		-O3 -march=pentium3	142.65	136.02	160.53	96.51	142.80	143.90	166.47	106.56	136.09	
		-O3 -mtune=pentium2	142.60	136.32	160.99	95.98	143.20	143.90	166.47	107.97	136.32	
		-Os	88.37	107.03	108.85	78.06	90.19	117.07	144.45	97.28	105.87	
		-Os -march=pentium2	89.53	107.86	109.49	78.95	91.10	117.07	146.01	98.30	106.74	
		-Os -march=pentium3	89.46	107.86	109.49	78.85	91.10	117.07	146.01	96.75	106.50	
		-Os -mtune=pentium2	89.41	107.85	109.66	78.98	91.04	117.07	145.92	98.30	106.74	
		gcc 4.1.1	-O0	136.41	134.46	147.75	106.92		141.46	173.49	107.28	135.40
			-O1	102.78	115.68	125.02	87.72		129.27	151.65	99.08	115.89
			-O2	104.26	118.81	125.21	87.07		133.41	153.67	99.21	117.38
	-O2 -march=pentium2		112.02	123.19	130.45	90.17		138.54	158.44	104.26	122.44	
	-O2 -march=pentium3		112.03	123.23	130.45	90.08		138.54	158.44	104.26	122.43	
	-O2 -mtune=pentium2		112.17	123.23	130.75	90.23		138.54	158.17	104.26	122.48	
	-O3		128.47	138.89	162.22	93.59		147.32	152.71	109.51	133.24	
	-O3 -march=pentium2		136.13	142.09	167.47	96.64		153.17	159.17	120.39	139.29	
	-O3 -march=pentium3		136.07	142.15	167.47	96.55		153.17	159.17	120.39	139.28	
	-O3 -mtune=pentium2		136.27	142.71	167.47	96.68		153.17	159.36	120.39	139.44	
	-Os		88.57	107.39	109.78	68.90		120.73	143.72	97.38	105.21	
	-Os -march=pentium2		88.75	107.47	109.78	68.94		120.73	143.44	97.97	105.30	
	-Os -march=pentium3		88.72	107.47	109.78	68.92		120.73	143.44	98.07	105.30	
	-Os -mtune=pentium2	88.75	107.39	109.85	68.90		120.73	143.44	97.97	105.29		
	Data	cc	-O1	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			-O2	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			-O3			100.00	100.00	100.00	100.00	100.00	100.00	100.00
		gcc 3.4.3	-O0	96.10	109.91	108.69	92.69	77.52	228.57	180.59	88.78	129.33
			-O1	96.04	109.91	108.64	92.64	77.52	228.57	180.59	88.78	129.31
			-O2	96.23	111.10	107.51	92.64	76.66	228.57	180.59	88.78	129.35
			-O2 -march=pentium2	96.10	111.03	107.51	92.64	77.00	228.57	180.59	88.78	129.32
			-O2 -march=pentium3	96.08	111.03	107.51	92.64	77.00	228.57	180.59	88.78	129.31
			-O2 -mtune=pentium2	96.10	111.03	107.51	92.64	76.66	228.57	180.59	88.78	129.32
-O3			98.48	110.82	107.51	92.38	77.26	228.57	180.59	88.78	129.59	
-O3 -march=pentium2			98.30	110.75	107.51	92.43	77.60	228.57	180.59	88.78	129.56	
-O3 -march=pentium3			98.28	110.75	107.51	92.43	77.60	228.57	180.59	88.78	129.56	
-O3 -mtune=pentium2			98.30	110.75	107.51	92.43	77.26	228.57	180.59	88.78	129.56	
-Os			91.29	109.91	103.20	90.48	65.01	228.57	163.00	88.78	125.03	
-Os -march=pentium2			91.29	109.91	103.20	90.48	65.35	228.57	163.00	88.78	125.03	
-Os -march=pentium3			91.29	109.91	103.20	90.48	65.35	228.57	163.00	88.78	125.03	
-Os -mtune=pentium2			91.29	109.91	103.20	90.48	65.01	228.57	163.00	88.78	125.03	
gcc 4.1.1			-O0	96.10	109.91	108.64	92.69		228.57	180.59	88.78	129.33
			-O1	96.14	111.03	107.78	92.60		228.57	179.12	88.78	129.15
			-O2	96.14	111.03	107.78	92.60		228.57	179.12	88.78	129.15
		-O2 -march=pentium2	96.00	111.03	107.78	92.60		228.57	179.12	88.78	129.13	
		-O2 -march=pentium3	96.00	111.03	107.78	92.60		228.57	179.12	88.78	129.13	
		-O2 -mtune=pentium2	96.00	111.03	107.78	92.60		228.57	179.12	88.78	129.13	
		-O3	100.70	111.03	107.73	92.43		228.57	179.12	88.78	129.76	
		-O3 -march=pentium2	100.35	111.03	107.73	92.43		228.57	179.12	88.78	129.72	
		-O3 -march=pentium3	100.35	111.03	107.73	92.43		228.57	179.12	88.78	129.72	
		-O3 -mtune=pentium2	100.35	111.03	107.73	92.43		228.57	179.12	88.78	129.72	
		-Os	91.30	109.91	103.42	90.43		228.57	161.54	88.78	124.85	
		-Os -march=pentium2	91.28	109.91	103.42	90.43		228.57	161.54	88.78	124.85	
		-Os -march=pentium3	91.28	109.91	103.42	90.43		228.57	161.54	89.02	124.88	
-Os -mtune=pentium2		91.28	109.91	103.42	90.43		228.57	161.54	88.78	124.85		
BSS		cc	-O1	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			-O2	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
			-O3			100.00	100.00	100.00	100.00	100.00	100.00	100.00
		gcc 3.4.3	-O0	120.39	100.37	130.41	107.30	106.46	100.00	101.23	136.96	113.81
			-O1	120.39	100.37	130.41	107.30	106.46	100.00	101.23	136.96	113.81
			-O2	120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81
			-O2 -march=pentium2	120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81
			-O2 -march=pentium3	120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81
			-O2 -mtune=pentium2	120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81
	-O3		120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81	
	-O3 -march=pentium2		120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81	
	-O3 -march=pentium3		120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81	
	-O3 -mtune=pentium2		120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81	
	-Os		120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81	
	-Os -march=pentium2		120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81	
	-Os -march=pentium3		120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81	
	-Os -mtune=pentium2		120.39	100.37	130.41	107.30	106.32	100.00	101.23	136.96	113.81	
	gcc 4.1.1		-O0	120.39	100.37	130.41	107.30		100.00	101.23	136.96	113.81
			-O1	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79
			-O2	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79
		-O2 -march=pentium2	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-O2 -march=pentium3	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-O2 -mtune=pentium2	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-O3	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-O3 -march=pentium2	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-O3 -march=pentium3	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-O3 -mtune=pentium2	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-Os	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-Os -march=pentium2	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
		-Os -march=pentium3	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79	
	-Os -mtune=pentium2	120.27	100.37	130.41	107.30		100.00	101.23	136.96	113.79		

Used color scale

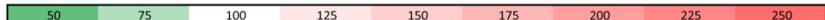


Figure 19 - Segment sizes indexed to cc -O1 at 100

# Execution

Pentium 2 350MHz - Execution benchmark set 1 in ticks (60 ticks = 1 second)															
Time	Compiler	Test	Test Optimization parameters	awk duplicates	awk pi	bc e	bc pi	python pybench	python pystone	sed reverse	sorting bubble	sorting insertion	sorting quick	sorting selection	whetstone whetstone
User	cc			384.5	4,543.0	10,993.7	12,780.0	18,785.6	920.7	616.4	14,990.0	5,661.0	86.6	8,171.0	20,409.0
		-01		384.5	4,438.0	10,704.7	12,204.7	18,797.9	904.3	625.2	14,834.0	5,933.0	86.5	7,997.0	19,858.0
		-02				9,929.3	7,285.3			625.6	18,402.0	5,351.0	101.8	8,034.0	20,409.0
	gcc 3.4.3	-00		382.8	2,628.0	7,352.3	14,550.7	17,502.4	1,007.0	955.2	18,481.0	5,996.0	90.8	10,502.0	7,516.0
		-01		349.8	2,469.0	3,158.0	6,113.3	16,821.4	778.7	518.2	10,509.0	3,432.0	69.8	7,213.0	7,487.0
		-02		340.0	2,417.3	2,864.3	5,559.7	16,568.8	710.0	501.8	10,583.0	3,431.0	71.0	7,066.0	7,620.0
		-02 -march=pentium2		356.4	2,402.0	4,139.3	16,352.7	16,432.8	697.0	495.6	9,900.0	3,204.0	66.0	6,449.0	7,586.0
		-02 -mtune=pentium2		355.7	2,385.3	3,985.7	16,349.0	16,864.9	706.7	477.2	9,901.0	3,205.0	66.0	6,449.0	7,587.0
		-03		308.0	2,394.3	4,538.3	16,593.3	16,593.3	675.3	483.6	9,356.0	2,875.0	71.0	6,618.0	5,505.0
		-03 -march=pentium2		337.2	2,355.0	4,227.7	17,424.7	14,783.0	706.7	463.2	9,302.0	2,364.0	65.8	5,944.0	5,608.0
		-03 -mtune=pentium2		331.5	2,362.3	4,078.0	17,421.0	16,479.7	694.0	459.0	9,303.0	2,364.0	65.7	5,944.0	7,413.0
		-0s		326.8	2,385.3	5,825.0	6,754.0	15,993.8	736.0	504.8	10,874.0	4,142.0	70.3	7,990.0	7,643.0
		-0s -march=pentium2		349.1	2,396.8	6,836.0	18,610.7	16,770.9	745.0	493.4	10,601.0	4,264.0	71.4	7,582.0	7,523.0
		-0s -mtune=pentium2		351.6	2,407.5	6,775.7	18,610.0	16,947.4	745.7	503.8	10,601.0	4,265.0	71.1	7,584.0	7,527.0
	gcc 4.1.1	-00				8,036.7	13,704.3	16,734.8	1,068.3	1,010.4	18,480.0	6,726.0	93.4	9,929.0	8,409.0
		-01				3,513.3	6,675.7	16,747.6	711.0	544.2	10,727.0	3,260.0	73.7	7,310.0	8,417.0
		-02				3,250.3	6,098.0	16,521.7	650.0	486.8	10,286.0	3,333.0	72.4	7,096.0	8,240.0
		-02 -march=pentium2				3,510.0	7,729.3	15,688.0	666.7	480.4	10,014.0	3,063.0	66.8	6,539.0	8,219.0
		-02 -mtune=pentium2				3,403.3	7,725.7	15,437.8	649.7	487.0	10,016.0	3,064.0	66.9	6,539.0	8,219.0
		-03				4,573.3	5,575.3	16,442.4	656.3	522.8	9,960.0	3,200.0	71.1	6,602.0	6,027.0
		-03 -march=pentium2				3,680.0	7,731.3	16,062.4	621.0	478.4	9,339.0	2,875.0	67.1	5,937.0	6,025.0
		-03 -mtune=pentium2				3,249.0	7,722.7	16,390.4	637.7	507.6	9,338.0	2,876.0	67.4	5,937.0	6,025.0
		-0s				5,937.7	7,117.0	16,497.3	705.3	560.6	11,126.0	3,711.0	72.0	8,271.0	8,246.0
		-0s -march=pentium2				5,873.0	7,809.3	15,510.2	694.3	540.6	10,773.0	3,711.0	72.0	8,129.0	8,236.0
		-0s -mtune=pentium2				5,913.7	7,355.7	15,566.8	701.0	542.2	10,772.0	3,711.0	72.1	8,129.0	8,238.0

Pentium 3 1GHz - Execution benchmark set 1 in ticks (60 ticks = 1 second)															
Time	Compiler	Test	Test Optimization parameters	awk duplicates	awk pi	bc e	bc pi	python pybench	python pystone	sed reverse	sorting bubble	sorting insertion	sorting quick	sorting selection	whetstone whetstone
User	cc			131.6	1,571.5	3,814.3	4,443.0	4,706.1	294.7	213.8	4,940.0	1,880.0	32.0	2,637.0	7,094.0
		-01		131.1	1,541.5	3,697.3	4,241.3	4,647.0	292.3	217.2	4,935.0	1,924.0	31.9	2,592.0	6,911.0
		-02				3,442.7	2,532.3			217.8	6,293.0	1,764.0	37.2	2,591.0	7,109.0
	gcc 3.4.3	-00		130.6	906.0	2,563.3	5,054.3	4,033.1	314.3	332.0	6,232.0	2,061.0	33.6	3,425.0	2,612.0
		-01		119.5	854.3	1,089.0	2,125.0	3,637.7	244.0	180.6	3,473.0	1,099.0	26.4	2,380.0	2,600.0
		-02		116.7	833.0	983.3	1,932.7	3,533.8	223.7	175.0	3,502.0	1,106.0	26.7	2,280.0	2,646.0
		-02 -march=pentium3		121.2	824.3	1,430.0	5,685.3	3,569.5	217.7	172.4	3,274.0	1,015.0	25.1	2,072.0	2,660.0
		-02 -mtune=pentium3		121.7	825.5	1,376.0	5,683.0	3,457.3	220.0	165.8	3,272.0	1,015.0	25.1	2,073.0	2,634.0
		-03		105.8	820.3	1,568.7	1,957.0	3,475.3	209.7	166.8	3,059.0	905.0	27.0	2,135.0	1,915.0
		-03 -march=pentium3		116.5	810.8	1,459.7	6,056.7	3,438.2	218.0	160.0	3,093.0	729.0	25.0	1,881.0	1,966.0
		-03 -mtune=pentium3		114.0	817.8	1,408.0	6,056.3	3,439.5	213.0	160.6	3,093.0	728.0	25.0	1,881.0	2,574.0
		-0s		112.9	825.3	2,016.3	2,348.0	3,572.2	228.7	176.0	3,579.0	1,300.0	26.5	2,524.0	2,574.0
		-0s -march=pentium3		120.7	830.3	2,367.0	6,469.7	3,560.2	236.0	171.0	3,461.0	1,388.0	27.0	2,438.0	2,618.0
		-0s -mtune=pentium3		121.6	833.5	2,346.0	6,469.3	3,697.3	236.0	175.8	3,461.0	1,388.0	26.9	2,438.0	2,618.0
	gcc 4.1.1	-00				2,783.3	4,761.7	4,064.2	321.7	350.6	6,213.0	2,444.0	34.5	3,460.0	2,919.0
		-01				1,116.3	2,321.0	3,597.9	215.0	189.0	3,585.0	1,046.0	27.8	2,440.0	2,924.0
		-02				1,121.7	2,120.0	3,412.9	201.0	169.8	3,455.0	1,093.0	27.0	2,339.0	2,864.0
		-02 -march=pentium3				1,187.7	2,685.7	3,456.0	202.0	166.2	3,357.0	972.0	25.6	2,157.0	2,857.0
		-02 -mtune=pentium3				1,175.3	2,684.3	3,471.0	199.0	169.0	3,357.0	972.0	25.5	2,157.0	2,857.0
		-03				1,581.0	1,937.7	3,464.8	204.3	181.6	3,306.0	1,013.0	26.8	2,140.0	2,093.0
		-03 -march=pentium3				1,249.7	2,686.3	3,445.2	191.3	167.2	3,086.0	929.0	25.5	1,927.0	2,094.0
		-03 -mtune=pentium3				1,121.0	2,683.0	3,424.0	194.0	176.2	3,087.0	929.0	25.5	1,926.0	2,094.0
		-0s				2,055.7	2,473.0	3,608.8	220.0	194.6	3,720.0	1,227.0	27.4	2,719.0	2,861.0
		-0s -march=pentium3				2,019.0	2,340.0	3,482.2	214.3	187.2	3,609.0	1,227.0	27.1	2,635.0	2,861.0
		-0s -mtune=pentium3				2,047.7	2,557.3	3,446.9	217.0	188.2	3,610.0	1,228.0	27.7	2,634.0	2,860.0

Figure 20 - Execution benchmark set 1 times in ticks

Pentium 2 350MHz - Execution benchmark set 1 (indexed to cc -O1 at 100)															
Time	Compiler	Test	awk duplicates	awk pl	bc e	bc pi	python pybench	python pystone	sed reverse	sorting bubble	sorting insertion	sorting quick	sorting selection	whetstone whetstone	AVERAGE (excl. awk)
User	cc	Optimization parameters	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		-O1	99.8	97.6	97.4	95.5	100.1	98.2	101.4	99.0	104.8	99.9	98.3	97.3	99.1
		-O2			90.3	57.0			101.5	122.8	94.5	117.6	98.3	100.0	
		-O3							101.5	123.3	105.9	104.8	128.5	36.8	103.8
	gcc 3.4.3	-O0	99.4	57.8	66.9	113.9	93.2	109.4	155.0	70.1	60.6	80.6	88.3	36.7	67.1
		-O1	90.8	54.3	28.7	47.8	89.5	84.6	84.1	70.6	60.6	82.0	86.5	37.3	65.3
		-O2	88.2	53.2	26.1	43.5	88.2	77.1	81.4	70.6	60.6	82.0	86.5	37.3	65.3
		-O2 -march=pentium2	92.5	52.9	37.7	128.0	87.5	75.7	80.4	66.0	56.6	76.2	78.9	37.2	72.4
		-O2 -mtune=pentium2	92.3	52.5	36.3	127.9	89.8	76.8	77.4	66.1	56.6	76.2	78.9	37.2	72.3
		-O3	79.9	52.7	41.3	44.1	88.3	73.4	78.5	62.4	50.8	82.0	81.0	27.0	62.9
		-O3 -march=pentium2	87.5	51.8	38.5	136.3	87.7	76.8	75.1	62.1	41.8	76.0	72.7	27.5	68.5
		-O3 -mtune=pentium2	86.0	52.0	37.1	136.3	87.7	75.4	74.5	62.1	41.8	75.9	72.7	36.3	70.0
		-O5	84.8	52.5	53.0	45.8	85.1	79.9	81.9	72.5	73.2	81.2	97.8	37.4	71.5
		-O5 -march=pentium2	90.6	52.7	62.2	145.6	89.3	80.9	80.0	70.7	75.3	82.4	92.8	36.9	81.6
		-O5 -mtune=pentium2	91.3	53.0	61.6	145.6	90.2	81.0	81.7	70.7	75.3	82.1	92.8	36.9	81.8
	gcc 4.1.1	-O0			73.1	107.2	89.1	116.0	163.9	123.3	118.8	107.9	41.2	41.2	106.2
		-O1			32.0	52.2	89.2	77.2	88.3	71.6	57.6	85.1	89.5	41.2	68.4
		-O2			29.6	47.7	87.9	70.6	79.0	68.6	58.9	83.6	86.8	40.4	65.3
		-O2 -march=pentium2			31.9	60.5	83.5	72.4	77.9	66.8	54.1	77.1	80.0	40.3	64.5
		-O2 -mtune=pentium2			31.0	60.5	82.2	70.6	79.0	66.8	54.1	77.3	80.0	40.3	64.2
		-O3			41.6	43.6	87.5	71.3	84.8	66.4	56.5	82.1	80.8	29.5	64.4
		-O3 -march=pentium2			33.5	60.5	85.5	67.5	77.6	62.3	50.8	77.5	72.7	29.5	61.7
		-O3 -mtune=pentium2			29.6	60.4	87.2	69.3	82.3	62.3	50.8	77.8	72.7	29.5	62.2
		-O5			54.0	55.7	87.8	76.6	90.9	74.2	65.6	83.1	101.2	40.4	73.0
		-O5 -march=pentium2			53.4	61.1	82.6	75.4	87.7	71.9	65.6	83.1	99.5	40.4	72.1
		-O5 -mtune=pentium2			53.8	57.6	82.9	76.1	88.0	71.9	65.6	83.3	99.5	40.4	71.9

Figure 21 - Execution benchmark set 1 indexed to cc -O1 at 100

Pentium 3 1GHz - Execution time set 1 (indexed to cc -O1 at 100)															
Time	Compiler	Test	awk duplicates	awk pl	bc e	bc pi	python pybench	python pystone	sed reverse	sorting bubble	sorting insertion	sorting quick	sorting selection	whetstone whetstone	AVERAGE (excl. awk)
User	cc	Optimization parameters	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		-O1	99.6	98.1	96.9	95.5	98.7	99.2	101.6	99.9	102.3	99.7	98.3	97.4	99.0
		-O2			90.3	57.0			101.9	127.4	93.8	116.3	98.3	100.2	
		-O3							101.9	126.2	109.6	105.0	129.9	36.8	103.6
	gcc 3.4.3	-O0	99.2	57.7	67.2	113.8	85.7	106.7	155.3	70.3	58.5	82.5	90.3	36.7	65.9
		-O1	90.8	54.4	28.6	47.8	77.3	82.8	84.5	70.9	58.8	83.6	86.5	37.3	63.9
		-O2	88.7	53.0	25.8	43.5	75.1	75.9	81.9	70.9	58.8	83.4	86.5	37.3	63.9
		-O2 -march=pentium3	92.1	52.4	37.5	128.0	75.8	73.9	80.6	66.3	54.0	78.4	78.6	37.5	71.1
		-O2 -mtune=pentium3	92.5	52.5	36.1	127.9	73.5	74.7	77.5	66.2	54.0	78.4	78.6	37.1	70.4
		-O3	80.4	52.2	41.1	44.1	73.8	71.2	78.0	61.9	48.1	84.4	81.0	27.0	61.1
		-O3 -march=pentium3	88.5	51.6	38.3	136.3	73.1	74.0	74.8	62.6	38.8	78.1	71.3	27.7	67.5
		-O3 -mtune=pentium3	86.6	52.0	36.9	136.3	73.1	72.3	75.1	62.6	38.7	78.1	71.3	36.3	68.1
		-O5	85.8	52.5	52.9	53.8	75.9	77.6	82.3	72.4	69.1	82.8	95.7	37.4	69.9
		-O5 -march=pentium3	91.7	52.8	62.1	145.6	75.7	80.1	80.0	70.1	73.8	84.4	92.5	36.9	80.1
		-O5 -mtune=pentium3	92.4	53.0	61.5	145.6	78.6	80.1	82.2	70.1	73.8	84.1	92.5	36.9	80.5
	gcc 4.1.1	-O0			73.0	107.2	86.4	109.2	164.0	125.8	119.4	107.8	131.2	41.1	106.5
		-O1			29.3	52.2	76.5	75.0	88.4	72.6	55.6	86.9	92.5	41.2	66.8
		-O2			29.4	47.7	72.5	68.2	79.4	69.9	58.1	84.4	88.7	40.4	63.9
		-O2 -march=pentium3			31.1	60.4	73.4	68.6	77.7	68.0	51.7	80.0	81.8	40.3	63.3
		-O2 -mtune=pentium3			30.8	60.4	73.8	67.5	79.0	68.0	51.7	79.7	81.8	29.5	62.8
		-O3			41.4	43.6	73.6	69.3	84.9	66.9	53.9	83.8	81.2	29.5	62.8
		-O3 -march=pentium3			32.8	60.5	73.2	64.9	78.2	62.5	49.4	79.7	73.1	29.5	60.5
		-O3 -mtune=pentium3			29.4	60.4	72.8	65.8	82.4	62.5	49.4	79.7	73.0	29.5	60.5
		-O5			53.9	55.7	76.7	74.7	91.0	75.3	65.3	85.6	103.1	40.3	72.2
		-O5 -march=pentium3			52.9	52.7	74.0	72.7	88.0	73.1	65.3	84.7	99.9	40.3	71.1
		-O5 -mtune=pentium3			53.7	57.6	73.2	73.6	88.0	73.1	65.3	86.6	99.9	40.3	71.1

Used color scale



Pentium 2 350MHz - Execution time set 2 in ticks (60 ticks = 1 second)												
Time	Compiler	Test User/Real (cc -O1)	gzip2	awk	gzip2	gzip	gzip	sed	awk	sed		
			compression 96.89%	word_count 96.33%	decompression 95.76%	compression 91.29%	decompression 92.09%	substitute 84.99%	line_numbers 77.39%	selective print 72.78%		
Real	Optimization parameters											
Real	cc	-O1	3727.3	2103.0	986.1	692.9	69.0	57.3	311.8	34.9		
		-O2	3751.7	2100.3	988.3	678.6	70.3	56.7	319.0	35.2		
		-O3	3711.6		984.7			59.2		36.6		
	gcc 3.4.3	-O0	3720.4	2184.5	776.4	761.3	93.7	92.8	304.3	40.0		
		-O1	1801.8	1998.5	511.6	573.4	73.6	56.1	282.3	34.3		
		-O2	1940.4	1952.8	493.9	564.6	72.5	53.8	280.3	32.7		
		-O2 -march=pentium2	1957.7	1965.0	489.4	548.1	58.9	50.7	293.3	31.6		
		-O2 -mtune=pentium2	1935.1	1984.0	483.4	550.0	59.2	50.6	293.8	31.8		
		-O3	1832.5	1927.5	483.3	570.9	72.7	50.6	269.8	30.3		
		-O3 -march=pentium2	1868.7	1958.3	479.2	549.6	59.9	48.5	285.0	30.1		
		-O3 -mtune=pentium2	1803.6	1944.0	477.7	546.9	59.8	48.3	288.0	30.1		
		-Os	1721.4	2013.8	502.0	575.1	72.7	54.7	278.0	34.2		
		-Os -march=pentium2	1782.7	2008.0	487.2	554.2	60.7	52.0	298.3	34.6		
		-Os -mtune=pentium2	1829.0	2000.0	484.1	555.2	61.0	52.0	298.0	33.6		
		gcc 4.1.1	-O0	3862.5		777.9	874.2	98.1	106.7		40.5	
	-O1		1993.1		483.0	630.5	77.3	58.0		34.9		
	-O2		1943.0		481.5	609.9	77.5	55.1		32.5		
	-O2 -march=pentium2		1951.8		477.0	592.0	62.7	50.7		32.3		
	-O2 -mtune=pentium2		1915.9		475.4	598.3	62.7	49.8		31.9		
	-O3		1943.2		479.1	600.1	76.3	57.3		30.3		
	-O3 -march=pentium2		1935.3		467.5	584.6	63.6	50.6		29.4		
	-O3 -mtune=pentium2		1911.7		470.1	591.4	63.1	52.0		30.0		
	-Os		1777.0		500.5	686.3	77.6	59.8		35.2		
	-Os -march=pentium2		1827.1		487.2	656.5	63.1	57.0		33.4		
	-Os -mtune=pentium2		1811.0		493.6	654.1	63.1	54.9		32.5		
	User		cc	-O1	3611.4	2025.8	944.2	632.6	63.6	48.7	241.3	25.4
				-O2	3634.8	2023.3	944.6	614.1	64.9	47.5	250.3	25.0
				-O3	3601.7		941.5			50.6		24.9
			gcc 3.4.3	-O0	3602.4	2108.5	732.9	733.6	81.8	83.5	223.8	28.4
		-O1		1679.8	1912.8	469.1	544.5	61.2	47.1	217.3	23.5	
-O2		1824.8		1881.8	455.7	536.6	60.1	43.9	211.8	22.6		
-O2 -march=pentium2		1836.8		1888.8	443.5	518.3	46.2	41.6	223.3	21.2		
-O2 -mtune=pentium2		1820.6		1909.0	437.5	521.1	46.9	41.0	217.3	19.8		
-O3		1716.4		1853.3	442.9	542.2	60.0	40.1	197.8	19.3		
-O3 -march=pentium2		1755.6		1880.5	436.2	520.0	47.2	39.0	218.5	17.8		
-O3 -mtune=pentium2		1685.0		1863.5	434.3	515.8	48.0	38.5	212.0	16.1		
-Os		1602.4		1940.3	458.5	541.8	60.0	45.1	206.5	21.0		
-Os -march=pentium2		1661.5		1939.3	441.4	525.2	48.5	42.4	220.0	22.9		
-Os -mtune=pentium2		1706.1		1929.3	442.3	524.4	49.5	41.5	224.5	21.3		
gcc 4.1.1		-O0		3743.6		732.8	804.0	85.6	97.9		29.0	
		-O1	1868.9		442.2	555.3	65.8	48.1		22.6		
		-O2	1823.2		436.6	541.7	64.7	42.5		20.7		
		-O2 -march=pentium2	1827.7		436.3	521.9	51.5	42.1		20.0		
		-O2 -mtune=pentium2	1794.2		429.7	525.9	50.5	40.3		19.4		
		-O3	1824.6		434.8	531.1	64.6	47.8		16.7		
		-O3 -march=pentium2	1810.6		426.3	516.2	50.9	38.0		20.4		
		-O3 -mtune=pentium2	1788.5		433.2	522.0	50.5	42.5		18.6		
		-Os	1648.3		458.6	614.0	64.9	50.2		23.6		
		-Os -march=pentium2	1700.8		443.4	587.6	50.7	48.5		20.8		
		-Os -mtune=pentium2	1683.0		451.4	582.8	50.6	44.8		20.4		
		System	cc	-O1	41.2	76.8	41.3	9.1	4.6	8.6	70.5	9.5
				-O2	39.1	77.0	43.5	11.0	4.6	9.2	68.8	10.2
				-O3	38.3		43.0			8.5		11.6
			gcc 3.4.3	-O0	45.2	76.0	43.3	15.5	11.7	9.3	80.5	11.6
-O1				39.6	85.5	42.2	14.3	12.0	9.0	65.0	10.8	
-O2	40.7			71.0	38.0	14.9	12.0	9.8	68.5	9.9		
-O2 -march=pentium2	44.2			76.3	45.6	16.0	12.1	9.1	70.0	10.4		
-O2 -mtune=pentium2	40.1			75.0	45.2	15.7	11.7	9.6	76.5	12.0		
-O3	40.2			74.3	40.2	16.3	12.1	10.4	71.8	10.9		
-O3 -march=pentium2	37.3			77.8	42.6	15.1	12.0	9.5	66.3	12.3		
-O3 -mtune=pentium2	38.4			80.0	42.5	17.2	11.5	9.6	76.0	13.9		
-Os	41.1			73.5	43.0	17.2	12.3	9.6	71.5	13.1		
-Os -march=pentium2	42.2			68.5	45.3	14.8	11.9	9.5	78.3	11.7		
-Os -mtune=pentium2	41.3			70.8	41.3	16.4	11.1	10.2	73.5	12.3		
gcc 4.1.1	-O0			38.8		44.5	13.9	12.3	8.8		11.5	
	-O1		39.1		40.4	14.5	11.4	9.9		12.2		
	-O2		38.1		44.6	13.7	12.1	12.5		11.7		
	-O2 -march=pentium2		40.3		40.6	15.2	11.0	8.5		12.2		
	-O2 -mtune=pentium2		40.4		44.9	15.3	11.8	9.5		12.4		
	-O3		40.0		44.3	13.7	11.5	9.3		13.5		
	-O3 -march=pentium2		39.6		41.0	13.5	12.2	12.6		9.0		
	-O3 -mtune=pentium2		38.8		36.3	14.3	11.8	9.5		11.4		
	-Os		36.8		41.4	14.8	12.2	9.5		11.6		
	-Os -march=pentium2		42.5		43.5	15.5	12.0	8.5		12.5		
	-Os -mtune=pentium2		42.0		41.8	13.5	12.2	9.9		12.1		

Figure 22 - Execution benchmark set 2 times in ticks (Pentium 2 350MHz)

Pentium 3 1GHz - Execution time set 2 in ticks (60 ticks = 1 second)										
Time	Compiler	Test User/Real (cc -O1)	gzip2	awk	gzip2	gzip	gzip	sed	awk	sed
			compression 97.75%	word_count 97.40%	decompression 94.16%	compression 85.72%	decompression 88.88%	substitute 82.41%	line_numbers 74.15%	selective print 73.55%
Real	cc	Optimization parameters								
		-O1	1,462.5	1,114.3	404.1	193.5	23.9	19.9	103.5	12.1
		-O2	1,461.8	1,118.5	404.0	186.2	24.4	19.7	106.3	12.3
		-O3	1,471.4		401.2			20.6		12.7
	gcc 3.4.3	-O0	1,480.3	1,125.0	331.9	235.9	37.6	33.5	101.0	15.1
		-O1	809.8	1,075.5	242.0	155.9	30.3	20.8	94.0	13.2
		-O2	855.3	1,062.3	233.6	152.2	29.9	19.9	93.3	12.6
		-O2 -march=pentium3	860.6	1,060.0	233.1	146.2	25.5	18.8	98.0	12.3
		-O2 -mtune=pentium3	855.3	1,065.8	231.8	147.4	25.6	18.8	98.0	12.3
		-O3	817.7	1,065.3	230.4	153.8	30.0	18.8	89.8	11.6
		-O3 -march=pentium3	829.8	1,055.3	228.3	147.5	25.7	18.1	95.8	11.7
		-O3 -mtune=pentium3	808.9	1,052.8	227.9	146.3	25.7	18.0	95.5	11.6
		-Os	780.8	1,086.3	236.3	154.1	30.0	20.3	92.5	13.1
		-Os -march=pentium3	798.2	1,083.3	231.7	147.0	26.1	19.3	99.5	13.2
		-Os -mtune=pentium3	817.3	1,082.8	232.8	147.7	26.1	19.3	100.0	12.9
	gcc 4.1.1	-O0	1,522.7		330.0	255.8	38.6	38.3		15.3
		-O1	868.1		230.8	159.3	31.6	21.4		13.3
		-O2	849.0		230.9	152.2	31.8	20.4		12.5
		-O2 -march=pentium3	848.3		228.5	145.5	26.7	18.8		12.4
		-O2 -mtune=pentium3	841.9		229.1	148.5	26.8	18.5		12.3
		-O3	849.5		230.4	147.8	31.3	21.1		11.8
		-O3 -march=pentium3	844.8		226.4	144.1	27.0	19.1		11.5
		-O3 -mtune=pentium3	839.9		227.2	147.4	26.9	19.7		11.7
		-Os	792.4		235.3	186.9	31.7	22.0		13.4
		-Os -march=pentium3	808.6		232.1	185.5	26.9	21.0		12.8
		-Os -mtune=pentium3	805.5		234.5	174.6	26.9	20.3		12.5
User	cc	-O1	1,429.5	1,085.3	380.5	165.9	21.3	16.4	76.8	8.9
		-O2	1,428.0	1,090.8	380.1	158.4	21.9	16.7	80.8	8.6
		-O3	1,438.0		376.7			17.8		9.6
	gcc 3.4.3	-O0	1,436.8	1,095.5	306.8	213.1	27.8	28.7	74.8	9.5
		-O1	768.3	1,045.5	218.8	132.5	20.4	15.3	67.5	8.3
		-O2	815.7	1,030.3	211.1	129.8	20.2	15.4	68.5	6.8
		-O2 -march=pentium3	817.7	1,034.0	209.4	123.2	15.7	14.5	75.8	6.7
		-O2 -mtune=pentium3	815.7	1,039.3	208.9	125.1	15.7	14.5	71.5	7.1
		-O3	778.3	1,036.0	206.5	131.2	20.2	14.6	64.0	6.8
		-O3 -march=pentium3	791.0	1,023.8	204.5	124.2	16.0	14.1	71.5	6.4
		-O3 -mtune=pentium3	768.6	1,027.8	205.2	122.6	15.9	13.0	73.3	7.7
		-Os	736.7	1,059.0	211.9	131.7	20.3	15.6	68.8	8.0
		-Os -march=pentium3	755.9	1,055.8	208.5	123.7	16.1	15.0	75.5	7.3
		-Os -mtune=pentium3	776.3	1,051.5	209.1	124.7	16.5	14.4	73.5	8.2
	gcc 4.1.1	-O0	1,487.6		306.2	236.9	28.9	33.4		9.5
		-O1	831.1		206.5	138.9	22.5	16.7		7.9
		-O2	812.4		208.4	132.3	22.2	15.9		7.0
		-O2 -march=pentium3	812.4		206.0	123.9	17.2	14.4		7.5
		-O2 -mtune=pentium3	807.9		205.4	127.2	17.0	13.7		7.1
		-O3	813.1		206.7	127.9	22.1	16.4		6.7
		-O3 -march=pentium3	807.4		200.9	123.1	17.2	14.7		6.0
		-O3 -mtune=pentium3	802.6		203.6	127.5	17.1	14.6		6.3
		-Os	755.0		211.8	165.8	21.8	16.9		7.7
		-Os -march=pentium3	772.4		207.1	165.2	16.8	15.9		8.0
		-Os -mtune=pentium3	766.7		211.0	154.3	17.6	15.5		7.5
System	cc	-O1	19.8	29.0	22.6	5.3	2.1	3.5	26.5	3.2
		-O2	20.5	27.8	23.8	5.8	1.9	3.0	25.5	3.7
		-O3	21.4		24.4			2.7		3.1
	gcc 3.4.3	-O0	23.0	29.5	24.9	11.2	9.0	4.8	26.3	5.6
		-O1	21.7	30.0	23.2	12.1	9.1	5.5	26.5	4.9
		-O2	21.8	32.0	22.4	10.6	9.4	4.5	24.8	5.7
		-O2 -march=pentium3	24.2	26.0	23.7	11.8	9.0	4.2	22.3	5.5
		-O2 -mtune=pentium3	20.7	26.5	22.7	10.4	9.0	4.3	26.3	5.2
		-O3	21.2	29.0	23.9	11.4	9.1	4.1	25.8	4.8
		-O3 -march=pentium3	21.8	31.5	23.7	11.5	8.9	3.9	24.3	5.3
		-O3 -mtune=pentium3	22.8	24.8	22.5	12.0	9.3	5.0	22.3	3.9
		-Os	24.0	27.0	24.4	11.2	8.9	4.6	23.8	5.1
		-Os -march=pentium3	23.5	27.5	23.1	11.7	9.2	4.3	24.0	5.8
		-Os -mtune=pentium3	22.6	31.0	23.6	11.6	9.3	4.9	26.5	4.7
	gcc 4.1.1	-O0	22.4		23.0	11.0	9.4	4.9		5.8
		-O1	22.5		23.9	10.9	8.2	4.7		5.3
		-O2	22.5		22.4	11.3	8.7	4.4		5.4
		-O2 -march=pentium3	21.3		22.5	11.8	9.2	4.4		4.7
		-O2 -mtune=pentium3	19.9		23.7	11.4	9.0	4.8		5.2
		-O3	22.8		23.6	11.7	9.0	4.7		5.1
		-O3 -march=pentium3	22.3		25.4	11.8	8.9	4.3		5.5
		-O3 -mtune=pentium3	21.9		23.6	10.3	9.7	4.9		5.3
		-Os	23.0		23.4	12.6	9.2	5.1		5.7
		-Os -march=pentium3	21.4		24.9	11.8	9.9	5.1		4.8
		-Os -mtune=pentium3	22.8		23.4	11.3	8.4	4.8		5.0

Figure 23 - Execution benchmark set 2 times in ticks (Pentium 3 1GHz)

## Pentium 2 350MHz - Execution time set 2 (indexed to cc -O1 at 100)

Test			bzip2	awk	bzip2	gzip	gzip	sed	awk	sed	AVERAGE (excl. awk)
User/Real (cc -O1)			compression	word_count	decompression	compression	decompression	substitute	line_numbers	selective print	
Time	Compiler	Optimization parameters	96.89%	96.33%	95.76%	94.99%	91.43%	84.99%	77.39%	72.78%	
Real	cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		-O2	100.7	99.9	100.2	97.9	101.9	99.0	102.3	100.9	100.1
		-O3	99.6		99.9			103.3		104.9	
	gcc 3.4.3	-O0	99.8	103.9	78.7	109.9	135.7	162.0	97.6	114.6	116.8
		-O1	48.3	95.1	51.9	82.7	106.6	97.9	90.5	98.3	81.0
		-O2	52.1	92.9	50.1	81.5	105.0	93.9	89.9	93.7	79.4
		-O2 -march=pentium2	52.5	93.5	49.6	79.1	85.3	88.5	94.1	90.5	74.3
		-O2 -mtune=pentium2	51.9	94.4	49.0	79.4	85.7	88.3	94.2	91.1	74.2
		-O3	49.2	91.7	49.0	82.4	105.3	88.3	86.5	86.8	76.8
		-O3 -march=pentium2	50.1	93.1	48.6	79.3	86.8	84.6	91.4	86.2	72.6
		-O3 -mtune=pentium2	48.4	92.5	48.4	78.9	86.6	84.3	92.4	86.2	72.1
		-Os	46.2	95.8	50.9	83.0	105.2	95.5	89.2	98.0	79.8
		-Os -march=pentium2	47.8	95.5	49.4	80.0	87.9	90.8	95.7	99.1	75.8
		-Os -mtune=pentium2	49.1	95.1	49.1	80.1	88.4	90.8	95.6	96.3	75.6
	gcc 4.1.1	-O0	103.6		78.9	126.2	142.1	186.2		116.0	125.5
		-O1	53.5		49.0	91.0	111.9	101.2		100.0	84.4
		-O2	52.1		48.8	88.0	112.2	96.2		93.1	81.7
		-O2 -march=pentium2	52.4		48.4	85.4	90.9	88.5		92.6	76.3
		-O2 -mtune=pentium2	51.4		48.2	86.3	90.8	86.9		91.4	75.8
		-O3	52.1		48.6	86.6	110.5	100.0		86.8	80.8
		-O3 -march=pentium2	51.9		47.4	84.4	92.1	88.3		84.2	74.7
		-O3 -mtune=pentium2	51.3		47.7	85.3	91.4	90.8		86.0	75.4
		-Os	47.7		50.8	99.0	112.4	104.4		100.9	85.8
		-Os -march=pentium2	49.0		49.4	94.7	91.4	99.5		95.7	79.9
		-Os -mtune=pentium2	48.6		50.1	94.4	91.3	95.8		93.1	78.9
User	cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		-O2	100.6	100.3	100.0	97.1	102.0	97.5	103.7	98.4	99.3
		-O3	99.7		99.7			103.9		98.0	
	gcc 3.4.3	-O0	99.8	104.3	77.6	116.0	128.6	171.5	92.7	111.8	117.5
		-O1	46.5	94.6	49.7	86.1	96.3	96.7	90.1	92.5	78.0
		-O2	50.5	93.1	48.3	84.8	94.5	90.1	87.8	89.0	76.2
		-O2 -march=pentium2	50.9	93.4	47.0	81.9	72.7	85.4	92.5	83.5	70.2
		-O2 -mtune=pentium2	50.4	94.4	46.3	82.4	73.8	84.2	90.1	78.0	69.2
		-O3	47.5	91.6	46.9	85.7	94.4	82.3	82.0	76.0	72.1
		-O3 -march=pentium2	48.6	93.0	46.2	82.2	74.3	80.1	90.6	70.1	66.9
		-O3 -mtune=pentium2	46.7	92.1	46.0	81.5	75.5	79.1	87.9	63.4	65.4
		-Os	44.4	95.9	48.6	85.7	94.4	92.6	85.6	82.7	74.7
		-Os -march=pentium2	46.0	95.9	46.7	83.0	76.3	87.1	91.2	90.2	71.5
		-Os -mtune=pentium2	47.2	95.4	46.8	82.9	77.9	85.2	93.1	83.9	70.7
	gcc 4.1.1	-O0	103.7		77.6	127.1	134.7	201.0		114.2	126.4
		-O1	51.7		46.8	87.8	103.4	98.8		89.0	79.6
		-O2	50.5		46.2	85.6	101.7	87.3		81.5	75.5
		-O2 -march=pentium2	50.6		46.2	82.5	81.0	86.4		78.7	70.9
		-O2 -mtune=pentium2	49.7		45.5	83.1	79.5	82.8		76.4	69.5
		-O3	50.5		46.0	84.0	101.7	98.2		65.7	74.3
		-O3 -march=pentium2	50.1		45.1	81.6	80.1	78.0		80.3	69.2
		-O3 -mtune=pentium2	49.5		45.9	82.5	79.4	87.3		73.2	69.6
		-Os	45.6		48.6	97.1	102.1	103.1		92.9	81.6
		-Os -march=pentium2	47.1		47.0	92.9	79.7	99.6		81.9	74.7
		-Os -mtune=pentium2	46.6		47.8	92.1	79.5	92.0		80.3	73.1
System	cc	-O1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		-O2	94.9	90.7	105.4	120.7	98.4	107.0	97.5	107.4	105.6
		-O3	93.0		104.1			98.8		122.1	
	gcc 3.4.3	-O0	109.7	94.7	105.0	170.4	252.6	108.1	114.2	122.1	144.7
		-O1	96.1	106.5	102.1	157.4	257.1	104.7	92.2	113.7	138.5
		-O2	98.8	88.5	92.0	164.2	258.8	114.0	97.2	104.2	138.7
		-O2 -march=pentium2	107.2	95.0	110.4	176.0	260.4	105.8	99.3	109.5	144.9
		-O2 -mtune=pentium2	97.2	93.5	109.4	172.9	252.3	111.6	108.5	126.3	145.0
		-O3	97.5	92.5	97.3	179.7	259.5	120.9	101.8	114.7	144.9
		-O3 -march=pentium2	90.6	96.9	103.3	166.2	257.7	110.5	94.0	129.5	143.0
		-O3 -mtune=pentium2	93.3	99.7	102.9	188.8	247.4	111.6	107.8	146.3	148.4
		-Os	99.8	91.6	104.1	189.9	263.6	111.6	101.4	137.9	151.1
		-Os -march=pentium2	102.4	85.4	109.8	163.1	256.4	110.5	111.0	123.2	144.2
		-Os -mtune=pentium2	100.3	88.2	100.0	180.5	238.5	118.6	104.3	129.5	144.6
	gcc 4.1.1	-O0	94.1		107.8	152.5	264.0	102.3		121.1	140.3
		-O1	94.8		97.9	159.6	244.6	115.1		128.4	140.1
		-O2	92.4		108.0	151.0	261.0	145.3		123.2	146.8
		-O2 -march=pentium2	97.7		98.3	167.3	236.5	98.8		128.4	137.8
		-O2 -mtune=pentium2	98.0		108.7	168.9	254.4	110.5		130.5	145.2
		-O3	97.2		107.2	151.1	248.4	108.1		142.1	142.4
		-O3 -march=pentium2	96.2		99.2	148.2	262.2	146.5		94.7	141.2
		-O3 -mtune=pentium2	94.1		87.9	157.9	253.1	110.5		120.0	137.2
		-Os	89.3		100.3	162.7	263.3	110.5		122.1	141.4
		-Os -march=pentium2	103.1		105.4	171.0	258.6	98.8		131.6	144.8
		-Os -mtune=pentium2	101.9		101.2	148.1	262.9	115.1		127.4	142.8

Used color scale: < 20 (green), 40 (light green), 60 (yellow-green), 80 (yellow), 100 (orange), 120 (red-orange), 140 (red), > 160 (dark red)

Figure 24 - Execution benchmark set 2 indexed to cc -O1 (Pentium 2 350MHz)



### 3. Code listings

```
#include <stdio.h>

int main(int argc, char **argv){
    int identifier;
    identifier=1;
    printf("%d", identifier);
    return 0;
}
```

Code listing 1 - Repeated integer assignment

```
typedef int (*CMPFUN)(int, int);
void ArraySort(int This[], CMPFUN fun_ptr, unsigned int the_len)
{
    unsigned int indx;
    int cur_val;
    int prev_val;
    if (the_len <= 1)
        return;

    prev_val = This[0];

    for (indx = 1; indx < the_len; ++indx)
    {
        cur_val = This[indx];
        if ((*fun_ptr)(prev_val, cur_val) > 0)
        {
            /* out of order: array[indx-1] > array[indx] */
            unsigned int indx2;
            This[indx] = prev_val; /* move up the larger item first */

            /* find the insertion point for the smaller item */
            for (indx2 = indx - 1; indx2 > 0;)
            {
                int temp_val = This[indx2 - 1];
                if ((*fun_ptr)(temp_val, cur_val) > 0)
                {
                    This[indx2--] = temp_val;
                    /* still out of order, move up 1 slot to make room */
                }
                else
                    break;
            }
            This[indx2] = cur_val; /* insert the smaller item right here */
        }
        else
        {
            /* in order, advance to next element */
            prev_val = cur_val;
        }
    }
}
```

Code listing 2 - Repeated insertion sort, combined function

```

typedef int (*CMPFUN)(int, int);
void ArraySort%%(int This[], CMPFUN fun_ptr, unsigned int the_len)
{
    unsigned int indx;
    int cur_val;
    int prev_val;

    if (the_len <= 1)
        return;

    prev_val = This[0];

    for (indx = 1; indx < the_len; ++indx)
    {
        cur_val = This[indx];
        if ((*fun_ptr)(prev_val, cur_val) > 0)
        {
            /* out of order: array[indx-1] > array[indx] */
            unsigned int indx2;
            This[indx] = prev_val; /* move up the larger item first */

            /* find the insertion point for the smaller item */
            for (indx2 = indx - 1; indx2 > 0;)
            {
                int temp_val = This[indx2 - 1];
                if ((*fun_ptr)(temp_val, cur_val) > 0)
                {
                    This[indx2--] = temp_val;
                    /* still out of order, move up 1 slot to make room */
                }
                else
                    break;
            }
            This[indx2] = cur_val; /* insert the smaller item right here */
        }
        else
        {
            /* in order, advance to next element */
            prev_val = cur_val;
        }
    }
}

```

Code listing 3 - Insertion sort, separate functions