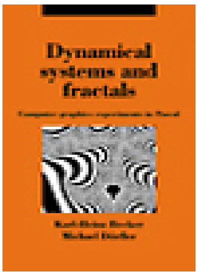

Dynamical Systems and Fractals

Computer Graphics Experiments with Pascal

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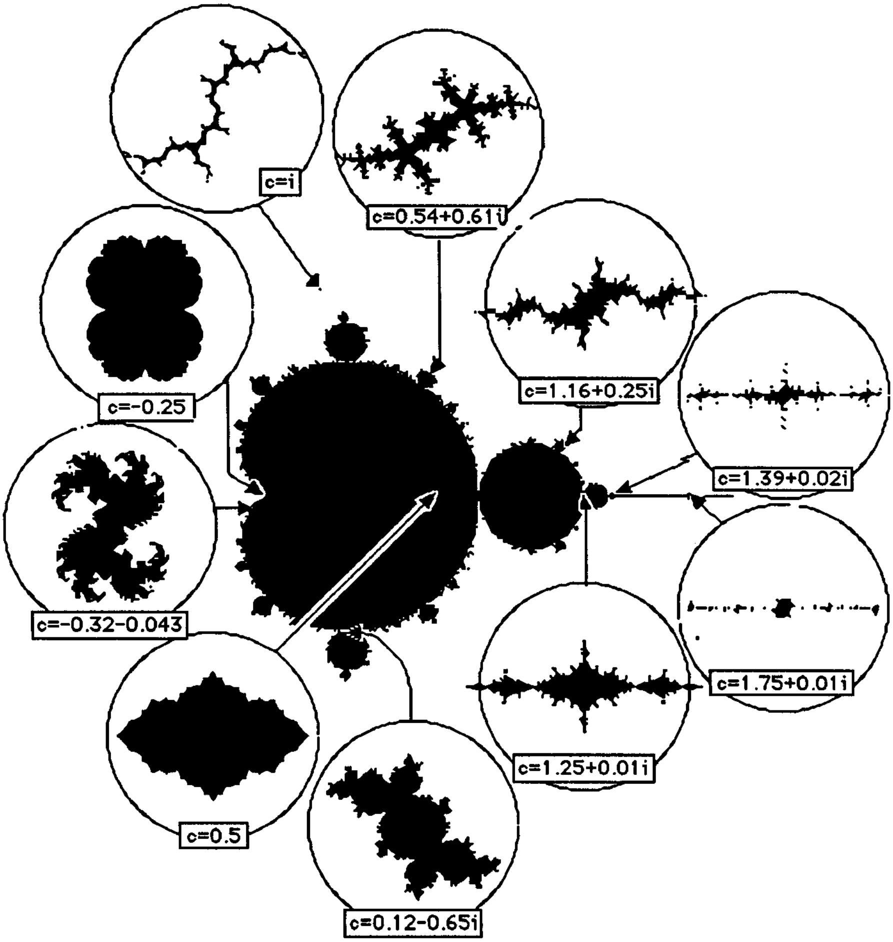
13 Appendices



13.1 Data for Selected Computer Graphics

Especially in your first investigations, it is useful to know where the interesting sections occur. Then you can test out your own programs there. Some of the more interesting Julia sets, together with their parameters in the Mandelbrot set, are collected together below.

In addition to the title picture for this Chapter, an 'Atlas' of the Mandelbrot set, we also give a table of the appropriate data for many of the pictures in this book. For layout reasons many of the original pictures have been cropped. Some data for interesting pictures may perhaps be missing: they come from the early days of our experiments, where there were omissions in our formulas or documentation.

Table 13-1 shows for each figure number the type of picture drawn, as this may not be clear from the caption. We use the following abbreviations:

G	Gingerbread man (Mandelbrot set) or variation thereon
J	Julia set, or variation thereon
C	Set after Curry, Garnett, Sullivan
N1	Newton development of the equation $f(x) = (x-1)*x*(x+1)$
N3	Newton development of the equation $f(x) = x^3-1$
N5	Newton development of the equation $f(x) = x^5-1$
T	Tomogram picture, see Chapter 6
F	Feigenbaum diagram
*	See text for further information

Near the (approximate) boundaries of the picture sections you will see the maximal number of iterations and the quantity that determines the spacing of the contour lines. The last two columns give the initial value for Mandelbrot sets, and the complex constant c for Julia sets.

Picture	Type	Left	Right	Top	Bottom	Maximal iteration	Bound	Complex constant or initial value c_r or $x0$	c_i or $y0$
5.1-2ff	N3	-2.00	2.00	-1.50	1.50	*	*	-	-
5.1-7	N5	-2.00	2.00	-1.50	1.50	25	5	-	-
5.2-1	J	-1.60	1.60	0.00	1.20	20	20	0.10	0.10
5.2-2	J	-1.60	1.60	0.00	1.20	20	20	0.20	0.20
5.2-3	J	-1.60	1.60	0.00	1.20	20	20	0.30	0.30
5.2-4	J	-1.60	1.60	-1.20	1.20	20	20	0.40	0.40
5.2-5	J	-1.60	1.60	-1.20	1.20	20	20	0.50	0.50
5.2-6	J	-1.60	1.60	0.00	1.20	20	20	0.60	0.60
5.2-7	J	-1.60	1.60	0.00	1.20	20	20	0.70	0.70
5.2-8	J	-1.60	1.60	0.00	1.20	20	20	0.80	0.80
5.2-9	J	-1.75	1.75	-1.20	1.20	200	0	0.745 405 4	0.113 006 3
5.2-10	J	-1.75	1.75	-1.20	1.20	200	0	0.745 428	0.113 009
5.2-11	J	0.15	0.40	-0.322	-0.15	200	40	0.745 405 4	0.113 006 3
5.2-12	J	0.29	0.316 4	-0.209 1	-0.191 4	400	140	0.745 405 4	0.113 006 3
5.2-13	J	0.295 11	0.298 14	-0.203 3	-0.201 3	400	140	0.745 405 4	0.113 006 3

Picture	Type	Left	Right	Top	Bottom	Maximal iteration	Bound	Complex constant or initial value c_r or $x0$	c_i or $y0$
5.2-14	J	0.295 11	0.298 14	-0.2033	-0.2013	400	140	0.745 428 4	0.113 009
5.2-15	J	0.296 26	0.296 86	-0.2024	-0.202	600	200	0.745 405 4	0.113 006 3
5.2-16	J	0.296 26	0.296 86	-0.2024	-0.202	600	200	0.745 428	0.113 009
5.2-17	J	-1.75	1.75	-1.20	1.20	50	0	0.745 428	0.113 009
5.2-18	J	-2.00	1.50	-1.20	1.20	1000	12	0.745 428	0.113 009
5.2-19	J	-0.08	0.07	-0.1	0.1	200	60	0.745 428	0.113 009
5.2-20	J	-0.08	0.07	-0.1	0.1	300	0	0.745 428	0.113 009
5.2-23	J	-1.75	1.75	-1.20	1.20	60	10	1.25	0.011
6.1-1	J	-0.05	0.05	-0.075	0.075	400	150	0.745 405 4	0.113 006 3
6.1-2	J	-0.05	0.05	-0.075	0.075	400	150	0.745 428	0.113 009
6.1-3	G	-1.35	2.65	-1.50	1.50	4	0	0.00	0.00
6.1-4	G	-1.35	2.65	-1.50	1.50	6	0	0.00	0.00
6.1-5	G	-1.35	2.65	-1.50	1.50	8	0	0.00	0.00
6.1-6	G	-1.35	2.65	-1.50	1.50	10	0	0.00	0.00
6.1-7	G	-1.35	2.65	-1.50	1.50	20	0	0.00	0.00
6.1-8	G	-1.35	2.65	-1.50	1.50	100	16	0.00	0.00
6.1-9	G	-1.35	2.65	-1.50	1.50	60	0	0.00	0.00
6.1-10	G	-0.45	-0.25	-0.10	0.10	40	40	0.00	0.00
6.1-11	G	1.934 68	1.949 3	-0.005	0.009	100	20	0.00	0.00
6.1-12	G	0.74	0.75	0.108	0.115 5	120	100	0.00	0.00
6.1-13	G	0.74	0.75	0.115 5	0.123	120	100	0.00	0.00
6.1-14	G	-0.465	-0.45	0.34	0.35	200	60	0.00	0.00
6.2-1ff	T	-2.10	2.10	-2.10	2.10	100	7	*	*
6.2-11	T	0.62	0.64	0.75	0.80	250	100	$y0$=0.1	c_i=0.4
6.3-4ff	F	0.60	0.90	0.00	1.50	50	250	-	-
6.4-1	C	-2.50	2.00	-2.00	2.00	250	0	0.00	0.00
6.4-2	C	-0.20	0.40	1.50	1.91	100	0	0.00	0.00
6.4-3ff	G*	-2.10	2.10	-2.10	2.10	100	7	0.00	0.00
6.4-6	C	0.90	1.10	-0.03	0.10	100	0	0.00	0.00
6.4-7	J*	-2.00	2.00	-2.00	2.00	225	8	-0.50	0.44
7.1-1	N1	-2.00	2.00	-1.50	1.50	20	0	-	-
7.1-2	N3	1.00	3.40	-4.50	-2.70	20	0	-	-
7.1-3	J	-2.00	2.00	-1.50	1.50	10	0	0.50	0.50
7.1-4	G	-1.35	2.65	-1.50	1.50	15	0	0.00	0.00
7.1-5	J	-2.00	2.00	-1.50	1.50	20	0	0.745	0.113
7.1-6	G	-1.35	2.65	-1.50	1.50	20	0	0.00	0.00
7.2-1	G	-4.00	1.50	-2.00	2.00	40	12	0.00	0.00
7.2-2	G*	-1.50	1.50	-0.10	1.50	40	7	0.00	0.00
7.2-3	G*	-3.00	3.00	-2.25	2.25	30	10	0.00	0.00
7.2-4	N3	-2.00	2.00	-1.00	1.50	40	3	-	-
7.2-5	J	-2.00	2.00	-1.50	1.50	30	10	1.39	-0.02
7.2-6	J	-18.00	18.00	-13.50	13.50	30	10	1.39	-0.02
7.2-7	J	-2.00	2.00	-1.50	1.50	30	30	-0.35	-0.004
7.2-8	J	-3.20	3.20	-2.00	4.80	30	30	-0.35	-0.004
7.4-1	G	-1.35	2.65	-1.50	1.50	20	0	0.00	0.00
7.4-2	G	-1.35	2.65	-1.50	1.50	20	0	0.00	0.00
7.4-3	J	-2.00	2.00	-1.50	1.50	30	0	0.50	0.50
7.4-4	J	-2.00	2.00	-1.50	1.50	30	5	-0.35	0.15
9.5	J	-1.00	1.00	-1.20	1.20	100	0	-0.30	-0.005
10-1	G	-1.35	2.65	-1.50	1.50	20	0	0.00	0.00

Picture	Type	Left	Right	Top	Bottom	Maximal iteration	Bound	Complex constant or initial value	
								c_r or $x0$	c_i or $y0$
10-2	G	0.80	0.95	-0.35	-0.15	25	0	0.00	0.00
10-3	G	0.80	0.95	-0.35	-0.15	25	15	0.00	0.00
10-4	G	0.85	0.95	-0.35	-0.25	25	0	0.00	0.00
10-5	G	0.85	0.95	-0.35	-0.25	25/50	15/21	0.00	0.00
10-6	G	0.857	0.867	-0.270	-0.260	50	0	0.00	0.00
10-7	G	0.857	0.867	-0.270	-0.260	100	40	0.00	0.00
10-8	G	0.915	0.940	-0.315	-0.305	100	40	0.00	0.00
10-9	G	0.935	0.945	-0.305	-0.295	100	40	0.00	0.00
10-10	G	0.925	0.935	-0.295	-0.285	100	40	0.00	0.00
10-11	G	0.857	0.867	-0.270	-0.260	100	40	0.00	0.00
10-12	G	0.900	0.92	-0.255	-0.275	150	60	0.00	0.00
10-13	G	1.044	1.172	-0.299 2	-0.211 6	60	30	0.00	0.00
10-14	G	1.044	1.172	-0.299 2	-0.211 6	60	30	0.00	0.00
10-15	G	1.044	1.172	-0.299 2	-0.211 6	60	30	0.00	0.00
10-16	G	0.75	0.74	0.108	0.115 5	120	99	0.00	0.00
10-19	G	0.745 05	0.745 54	0.112 91	0.113 24	400	100	0.00	0.00
10-20	G	0.745 34	0.745 90	0.112 95	0.113 05	400	140	0.00	0.00
10-21	G	0.015 36	0.015 40	1.020 72	1.020 75	300	60	0.00	0.00
12.1-1	F	1.80	3.00	0.00	1.50	50	100	-	-
12.4-2	F	1.80	3.00	0.00	1.50	50	100	-	-

Table 13-1 Data for selected pictures.

13.2 Figure Index

13.3 Program Index

We list here both programs and program fragments (without distinguishing them). Each represents the algorithmic heart of the solution to some problem. By embedding these procedures in a surrounding program you obtain a runnable Pascal program. It is left to you as an exercise to declare the requisite global variables, to change the initialisation procedure appropriately, and to fit together the necessary fragments (see hints in Chapters 11 and 12). The heading 'Comments' states which problem the procedures form a solution to.

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