THREE KEY DEFINITIONS

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March, 1997

For our colleagues, we provide these key definitions.

1. A summary of what we mean by "Christopher Alexander's principles"

The broad ideas which CA has introduced are the following:

In general:

The fundamental idea of all CA's work, is that fitness, goodness, and good designs, are concepts that can be objectively defined, in a way which is clear enough for people to use.
Further, the clarity is great enough so that people can use it both individually and collectively.
The outcome of the use of these processes, is good structure; a world worth living in, once again, objectively defined.

Notes on the Synthesis of Form

Design works best, as in biology, by progress on separable schemes. By separating design into small chunks, one can make adaptation occur successfully.

A Pattern Language

Knowledge about design can be recorded in the form of patterns.
The patterns may (in principle) be used combinatorially to create designs.
Patterns are the best way of remembering insights about design.
Patterns provide a way of sharing knowledge about design.
Ideally the use of the patterns opens the door to a very large population, including those typically considered outside the professional body.
The refinements of this theory now include a static and a dynamic component.

The Nature of Order, Book One (The static component)

Wholeness of a structure is well-defined.
Deeper underlying structures of wholeness have been identified; the centers; and all wholeness is made of strong centers.
Strong centers are identified by 15 relational properties which show the ways that centers aggregate to make one another come to life.
The most profound centers are linked to the depth of feeling which people have, so there is a correlation between life or structure, and the depth of feeling people have about that structure.
Quality of design, for the first time, appears on an objective basis.

Nature of Order, Book Two (the dynamic component)

The unfolding process, is identified as the process which naturally produces living centers.
Unfolding is a structure-preserving process; this is precisely defined.
All unfolding may be defined as a series of iterations of a fundamental process, which is the atomic center-creating process.

Nature of Order, Book Three (the modern environment)

> A range of examples show how the unfolding process, and fundamental process, may be applied to structures at almost all scales of our environment.
> Further, these buildings, streets, neighborhoods, gardens, which are defined by these process are demonstrated as having a living quality, in the heretofore given objective sense.
> This objectively living environment stands as an archetype of what the world should – and can -- become.
> The same criteria of living structure carry down to details of construction, engineering, and ornament.
> They create, together, a life in which individual and families, workgroups and societies, experience the quality of belonging to the world.

Nature of Order, Book Four (cosmology)

> The theory of centers has surprising implications for our understanding of the nature of matter.
> It creates a mental view in which we understand wholeness, not merely as a technical or structural device, but as a characteristic of the world, and the real universe, in a fashion that could alter our understanding of our position in the scheme of things.
> Practically, this new view thoroughly revises our idea of what it means to make and remake the world, in a fashion which is truly personal, and touches the "I" which exists in each person.
> Personal and objective are then cemented in a new unitary view.
> Our activity as builders is placed in a surprising fresh light by these cosmological conclusions.

The theory defines a good structure in such a way that it has almost unlimited range, and creativity is truly open; but a rather sharp dividing line is drawn between good structures and bad structures.

As a result the theory creates the groundwork for a view of a living world, in an objective structural sense.

2. How we plan to automate Chris's program for the design of the environment.

The research and development needed to achieve the overall program for design of the environment – especially that portrayed in Book Three of the Nature of Order, will require the following steps:

We propose to make an archetypal generator program type, which will combine the ideas of centers, sequence, structure-preserving transformations and evaluation.

This would be similar to (though vastly more complex than) the pilot Gatemaker, which represented 2 months work, but would need at least one year's work to make these various features operational.

It should be understood that the interface itself – the *way* the user interacts with the program – is significantly different in Gatemaker. In its development, this consumed some 80% of the effort – the role of computing itself was relatively minor.

The archetypal program will also include a calculus of centers. There are profound mathematical problems here, some of which cannot be solved in a short time; but viable approximations can be made to have the thing running in the short haul.

Once such an archetypal generative program exists, it will then be extended outward to cover 3 dimensions.
It will be extended to cover interaction with the users (wishes, dreams, desires, and needs).
It will be extended outward to cover many different building types (apartment, office, kitchen, café, playground, etc.).
It will then be broadened and given a new structure within which it will work in a *collective* mode, allowing many people to interact together in designing a single product.

In the CA framework, the nature of what is being done combines personal and objective views in a new and unique way, which will allow people to cooperate and find agreement without losing the personal dimension of what they are doing. Where today, they might simply bicker about values or goals, the nature of the theory is such that people will be able to cooperate in this kind of work.

A later series of programs will be written, further extending the center-creating theory, to cover the construction process. This series of programs will include new ideas about user interface, since such a program will interact with a user (such as a construction manager) over a period of many months, continuously.

3. The likely implications for software and software development.

As a very first cut at describing the probable implications for software and software design, we would include the following:

It is probable that the deep structures from the nature of order; centers, and fifteen center-combining properties, have direct implications for the organization of complex software.

Work needs to be done to translate these principles directly into actual software principles, and to show how these ideas reshape software organization.

It is also probable that the dynamic ideas of unfolding, sequence, and structure-preserving transformations have direct bearing on software design. The working hypothesis is that software designed within such a process will be better organized, will perform better, and have better goals.

The fact that this theory can effect the goals of software – not only the structure – is what we may loosely the moral component, which is likely to come about as a result of these ideas entering the field of computer science.

In broad terms one might say that it creates a vision of a possible future in which software is affected – even governed – by considerations of wholeness.

Ultimately, it is to be expected that this wholeness-seeking effect will affect not only the design and structure of software, but the human interface, and the goals which the software aspires to.

Above all it is probable that user friendly software will be very greatly improved by these theories.

It may be said that the ultimate goal -- of making software which interacts in a positive way with people -- will be the main outcome of the theory.

It is possible, as a spin-off, that software development tools, similar to the environmental designer's software, will be created, perhaps ultimately making it possible for a lay person to create their own software, for their own purposes, without intervention of an expert programmer.

It is nearly certain that another kind of spin-off will include the creation of software development tools *for* programmers, within which programmers will be enabled to write better software, with more profound structure, and with more profound results, than are possible today.

It is also likely that the notion, of any given piece of software having a visible and perspicuous structure, will emerge as a benefit of the thinking fostered by these principles.