I. CATEGORIES

A CATEGORY $\mathcal{C}$ CONSISTS OF:

(a) OBJECTS.

(b) MORPHISMS $\mathrm{Hom}_{\mathcal{C}}(X,Y)$ $\forall X,Y \in \mathcal{C}$.

(c) $\mathrm{id}_X : X \to X$ $\forall X \in \mathcal{C}$.

(d) $gf : W \to Y$ $\forall f : W \to X$, $g : X \to Y$.

SATISFYING

ASSOCIATIVITY
$(hg)f = h(gf)$

UNITALITY
$\mathrm{id}_X f = f$, $g\,\mathrm{id}_X = g$

$\Bbbk$ FIELD
ALG. CLOSED & CHAR. 0
(NOT NEEDED HERE)
A, B, C $\Bbbk$-ALGS

Group
GROUPS & GROUP HOMOMS.

Ab
ABELIAN GROUPS & GROUP HOMOMS.
NOT "ABELIAN GROUP HOMOMS" (↑ PROPERTY)

Rep(A)
REPNS OF A & REPN MORPHISMS

Ring
UNITAL RINGS & UNITAL RING HOMOMS.

Rng
RINGS & RING HOMOMS.

A-Mod, Mod-A, (A,B)-Bimod, A-Bimod — VARIOUS CATEGORIES OF (BI)MODULES

ALGEBRAIC CATEGORIES

ComRing
UNITAL COMMUTATIVE RINGS & UNITAL RING HOMOMS

Alg
$\Bbbk$-ALGEBRAS & $\Bbbk$-ALGEBRA HOMOMS.

ComAlg
COMMUTATIVE $\Bbbk$-ALGEBRAS & $\Bbbk$-ALGEBRA HOMOMS.

Vec
$\Bbbk$-VECTOR SPACES & $\Bbbk$-LINEAR MAPS

Bim
OBJECTS $\equiv$ $\Bbbk$-ALGEBRAS
MORPHISMS: $A \to B \Leftrightarrow [{}_AV_B \in (A,B)\text{-Bimod}]$ (~ISOCLASS~)
WITH: $\mathrm{id}_A \equiv {}_A(A_{\mathrm{reg}})_A$
$A \to B \to C \equiv {}_AV_B \otimes_B {}_BW_C \in (A,C)\text{-Bimod}$

Fd Alg
FINITE DIM'L $\Bbbk$-ALGEBRAS & $\Bbbk$-ALGEBRA HOMOMS.

FdVec
FINITE DIM'L $\Bbbk$-VECTOR SPACES & $\Bbbk$-LINEAR MAPS