

Princeton University

COS 217: Introduction to Programming Systems

An Expr Data Structure

Version 1

```
/* Structure definition: */

struct Expr
{
    enum ExprType iExprType;
    int iNumber;          /* Used when iExprType is EXPR_NUMBER */
    int iIndex;          /* Used when iExprType is EXPR_FLIPFLOPREF or EXPR_INPUTREF */
    Expr_T oChild;      /* Used when iExprType is EXPR_NOT */
    Expr_T oLeftChild;  /* Used when iExprType is EXPR_AND or EXPR_OR */
    Expr_T oRightChild; /* Used when iExprType is EXPR_AND or EXPR_OR */
};

/* Code to reference individual fields: */

oExpr->iExprType
oExpr->iNumber
oExpr->iIndex
oExpr->oChild
oExpr->oLeftChild
oExpr->oRightChild
```

Version 2 (preferred)

```
/* Structure definition: */

struct Expr
{
    enum ExprType iExprType;
    union
    {
        struct {int iNumber; } sNumber;
        struct {int iIndex; } sFlipFlopRef;
        struct {int iIndex; } sInputRef;
        struct {Expr_T oChild; } sNot;
        struct {Expr_T oLeftChild; Expr_T oRightChild; } sAnd;
        struct {Expr_T oLeftChild; Expr_T oRightChild; } sOr;
    } u;
};

/* Code to reference individual fields: */

oExpr->iExprType
oExpr->u.sNumber.iNumber
oExpr->u.sFlipFlopRef.iIndex
oExpr->u.sInputRef.iIndex
oExpr->u.sNot.oChild
oExpr->u.sAnd.oLeftChild
oExpr->u.sAnd.oRightChild
oExpr->u.sOr.oLeftChild
oExpr->u.sOr.oRightChild
```