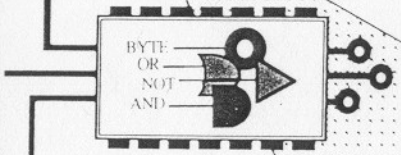
ZByte

ZByte

high tech
playing cards



game book enclosed

ZByte

ZByte

ZByte is a revolutionary new design in playing cards based on computers--the first logical change in 500 years!

Create and play a new generation of games for the twenty-first century.

Or play all your favorite traditional games, such as Solitaire, Black Jack, Poker, and Gin Rummy.

This 52-card deck contains the standard number cards, aces, jacks, queens, kings, but with four special suits, and two robot "IF" jokers.

Enclosed 32-page book has rules for eleven new games and instructions for ZByte game designers.

ZByte...

Help spread the revolution.
Put aside your ancient playing cards.
ZByte is the only deck you'll need
beyond the year 2001!

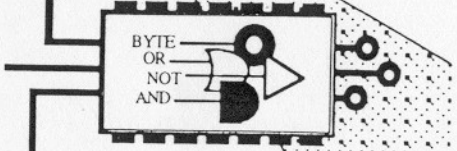
A $25 honorarium and a citation of your name are hereby offered for new ZByte games if they are published in future editions of this book. Educational games are encouraged. Each game's instructions should fit on one to three pages including illustrations.

Send your game to the address below. Please note that all submitted games become the property of ZByte with full and unrestricted rights and cannot be returned.

ZByte Games
P.O. Box 27676
San Francisco, CA 94127

ZByte™

high tech playing cards



This book contains eleven new games and instructions for the design of ZByte games of the future.

Introduction to ZByte™

Computer games abound, but playing cards continue to be the foremost tool of the game player. This is proof of the grandeur of the original design--basically unchanged for 500 years. ZByte is a serious attempt to enhance the ancient design while preserving compatibility for playing all of the wonderful traditional games that have evolved over the centuries. ZByte cards have added binary elements, and its suits are high-tech with intrinsic, functional meaning derived from nineteenth-century logic and twentieth-century technology. The suits of ordinary playing cards are derived from 15th-century French social classes: *tréfle* (club) stood for the peasantry; *carreau* (diamond) the husbandmen; *pique* (spade) the knights; and *cœur* (heart) the Church. These meanings play no role in card games today--the four ancient suits function only as separators. In contrast, the revolutionary ZByte suits not only serve as separation signs but also have universal meanings of their own that open up the possibility for a whole new generation of card games.

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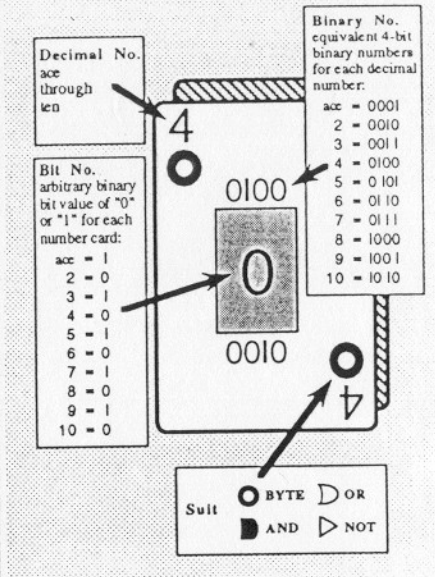
ZByte Number Cards



Playing traditional card games

The ZByte deck may be used for playing any card game. It contains 52 cards and two jokers with two black suits and two red suits, each suit with a conventional sequence from ace to king. Therefore, you may use the ZByte deck for playing traditional Solitaire, Poker, Gin Rummy, Black Jack--in fact, any game listed in Hoyle or Scarne. The only difference is the four new suit symbols: the NOT suit, the AND suit, the OR suit and the BYTE suit.

These ZByte suits are simple to recognize and their short names easy to memorize. While they are shaped similar to important international symbols of logic and digital computing, they do not change any of the rules of traditional games. You will be surprised how quickly you adapt to them.

For example, try playing any traditional game of Solitaire. After a few minutes of playing, you will find yourself completely comfortable with these new suits. Although not required in Solitaire, practice saying out loud the suit name of each card as you play. This exercise will help you memorize these names before playing ZByte games.

Playing ZByte card games

The eleven games in this book are the first published examples of a new generation of card games that use the special ZByte suits as defined, not just as four abstract symbols. If these descriptions seem too complicated, play ZByte games that feature specific suits. Their functions will soon be obvious.

AND cards may be played with other cards permitting them to be combined or activated logically if they are similar or match each other as defined by the game.

OR cards may be played with other cards permitting one card's numerical value or suit to be changed or activated logically if it alone meets game criteria.

NOT cards may alter the value or suit of a played card to its opposite, to a reverse value, or to anything-but!

BYTE cards are played to define a temporary condition; to set a meld size or numerical limit; or to clone or store a (memory) value or suit as defined by the game.

The ZByte deck will provide you with hours of entertainment and education as you explore the fundamentals of computers and basic logic.

The games in this book are not, by any means, the most exciting ones that could be invented. Their rules probably can be improved. New games are encouraged. See the special publisher's offer on the last page.

Designing ZByte card games

The Decimal Numbers: traditional two through ten, with the ace as a possible one.
The Binary Numbers: four-place binary numbers that equal the above decimal numbers.
The Bit Numbers: arbitrary binary bit value of "0" or "1" printed on ace to ten cards.
The Suits: three logic suits and one computer suit defined by the game.
The Jokers: "If--Then," defined by the game.

These are ZByte's five playing elements. Most games that you design will use only one or two elements. For example, all traditional games involve suits and decimal numbers just as all ZByte games in this book except for Binary Black Jack and the two Solitaires. Binary Black Jack uses only bit numbers. Binary Solitaire uses both binary numbers and bits. And Decimal-to-Binary Solitaire uses four elements: decimal and binary numbers, bits, and suits.

The ZByte suits of AND, OR, and NOT are basic logic building blocks that may be described in other ways. Logicians call them *gates* with inputs (preconditions) and outputs (results). The inputs and outputs of these gates have only two possible values, expressed in different situations as the binary states of "1 or 0," the "presence or absence" of a signal, "true or false" logic, "yes or no," "active or inactive," or "high or low."

Designing... (continued)

The AND gate may be defined as a gate (or card play) in which the output (result) is "true" only if *all* inputs (or *all* played cards) are "true" or match in some way, i.e., the output is a binary 1 if all inputs are 1. If one or both inputs are 0, then the output is a binary 0. Thus, you can define a precondition or value for which playing an AND card with two or more similar cards causes a specific outcome.

The OR gate may be defined as a gate (or card play or card meld) in which the output (result) is "true" if one or more of its inputs (cards) is "true" (satisfies your conditions), i.e., the output is a binary 1 if one or more of its inputs has a binary value of 1.

The NOT gate has only one input. And its output is always the opposite. A "true" input has a "false" output. A "false" input has a "true" output. "1" equals "0." "0" equals "1." For the purpose of ZByte game design, you may extend this concept further to allow a play result of *any* value other than the card's value. For example, a Four of NOTs could be defined as "any numerical value other than four." Or, a Four of NOTs could be defined as "a Four of any suit, except NOT."

Amazingly, these three fundamental logic gates are all that are needed to design the most complex supercomputer.

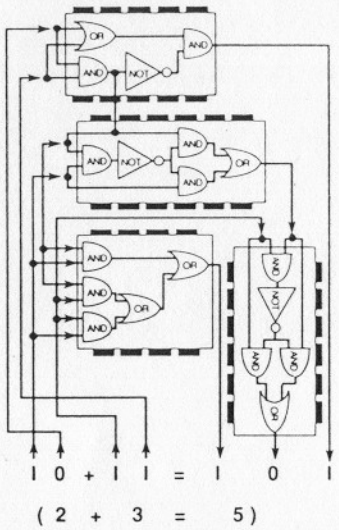
Designing... (continued)

BYTE has no intrinsic logical meaning, unlike AND, OR, and NOT, and, therefore, may support the other three suits. Its shape is derived from first-generation computer memory cores. A computer needs *memory* and this can be a function of the BYTE suit, in which other cards are frozen in value or location depending on the rules of the game. It might be a memory command card that completes, alters, or freezes particular plays. In computer terminology, it functions as a "flip-flop," or a single memory location. It also might assume the suit or numerical value of its paired card, such as in the GinBYTE Rummy game. And, in some games it might be used to define--and complete--a single computer word, which fits the definition of byte, e.g., one BYTE card (or an Ace of BYTEs) defining a one-bit word, four BYTE cards (or a Four of BYTEs), a four-bit word, etc.

JOKERS

Although, none of the games in this book use jokers, ZByte jokers can serve in new games as conditional cards or decision cards that trigger alternative plays. Thus, they are powerful, but occur rarely since there are only two jokers in the deck!. The diamond-shaped "IF" is often expressed in computer languages, spreadsheets and database programs as the statement, "IF-THEN," i.e., IF [a specific situation occurs], THEN [the play of the joker allows an alternative action]. ZByte jokers allow very interesting card plays, so use your imagination. Potential interaction exists between jokers, decimal and binary numbers, and binary bits.

How Logic Gates Add



A simple system of four microchips that contain sufficient AND, OR, and NOT gates to add two two-place binary numbers. As shown, an input of "10" + "11" produces an output of "101" (or 2+3=5). These systems multiplied manyfold are the heart and soul of all calculators and computers.

GinAND Rummy

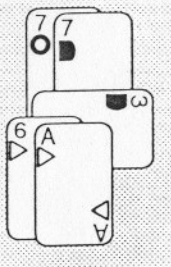
GinAND allows all of the legal melds of ordinary Gin Rummy, but, in addition, any AND card may be played horizontally to allow two other cards to be merged together (adding their numerical values) to complete a legal set or a legal sequence. The two other cards are played vertically just below the horizontal AND card as may be seen in the two examples.

In the example's set meld, the horizontal AND card (the Three of ANDs) allows the Six and Ace of NOTs to be merged and then combined with the Seven of BYTEs and the Seven of ANDs to have the result of a legal meld of 7-7-7. Note that in this meld, the opponent may play additional sevens with the exception of the Seven of NOTs.

In the example's sequence meld, the horizontal AND card (the Four of ANDs) allows the Seven and Two of BYTEs to be merged as a "9" and then combined with the Eight and Ten of BYTEs to have the result of a legal meld of 8-9-10. In this sequence meld, additional sequential cards below the Eight of NOTs or above the Ten of NOTs may be played. A "second" Nine of NOTs may not be played to the sequence meld.

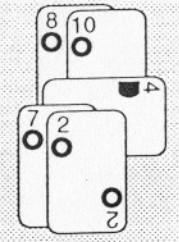
Neither player may play against any of the horizontal AND cards. As "logic operators," they can never be part of a set or sequence meld.

GinAND Set



The Three of ANDs adds the Ace and Six of NOTs to equal a Seven of NOTs.

GinAND Sequence



The Four of ANDs adds the Seven and Two of BYTEs to equal a Nine of BYTEs.

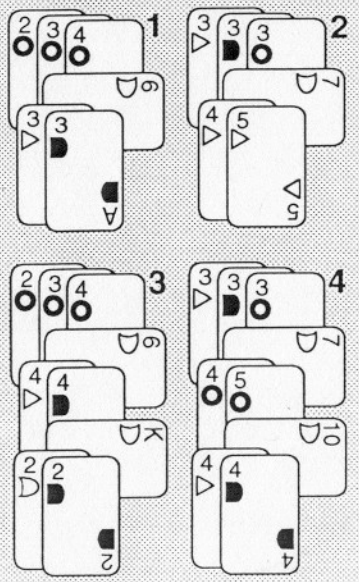
GinOR Rummy

In the GinOR version of Gin Rummy, all legal melds are permitted, but, in addition, the following double and triple melds are allowed.

SEQUENCE-OR DOUBLE MELD: Any OR card may be played horizontally just below any full sequence followed by two additional cards of identical numbers laid vertically, which when matched with a matching number in the sequence, constitute a set of three numbers. That is, the OR card allows one card in a sequence to serve double duty as part of two sets. **Example 1** has two melds: a sequence of 2-3-4 and, because of the logical operation of the Six of ORs, a set of 3-3-3.

SET-OR DOUBLE MELD: Similarly, any OR card may be played horizontally just below any full set, thus allowing one card in the set to be used doubly in a sequence, of which the two additional cards are laid vertically below the OR card. **Example 2** has two melds: a set of 3-3-3 and, because of the logical operation of the Seven of ORs, a sequence of 3-4-5.

TRIPLE MELDS: Examples 3 and **4** illustrate triple melds. A player may build traditional melds and additional OR melds on opponent's melds. However, melds may not be built against the horizontal OR cards. Example 3 has three melds: a sequence of 2-3-4, and because of the logical operation of the Six of ORs, a set of 4-4-4, and because of the logical operation of the King of ORs, a set of 2-2-2.



GinNOT Rummy

GinNOT allows all of the legal melds of ordinary Gin Rummy, but, in addition, any card of the NOT suit may be played with any ace to complete a set or sequence. The NOT card makes the ace logically false. In other words, the ace, which normally has a numerical value of one, is transformed to a numerical value of not-one (any desired value from two through king). Its suit is also transformed to "not-suit", i.e., any desired suit other than its own).

Example 1 is a GinNOT set meld in which the Three of NOTs makes the companion Ace of BYTEs any desired card other than an Ace of BYTEs--in this case a "Jack of ORs" to complete a set of J-J-J.

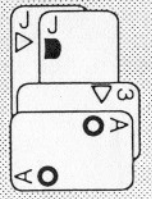
Example 2 is a GinNOT sequence meld in which the King of NOTs makes the companion Ace of ANDs any desired card other than an Ace of ANDs--in this case a "Six or Nine of ORs" to complete a sequence of 6-7-8 or 7-8-9.

Example 3 is a GinNOT sequence meld in which the King and Two of NOTs alter the companion Aces of BYTEs and ANDs to a pair of desired cards, or a "Six and Seven of BYTEs" completing a four-card sequence of 4-5-6-7.

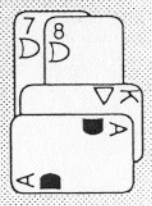
The opponent may build on these melds directly or with additional Ace-and-NOT combinations within the rules. Neither player may play against the horizontal combinations to build addtional melds.

Single GinNOT Melds

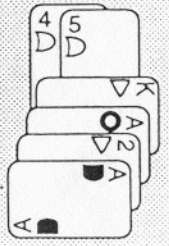
Example 1: any Ace may be played.



Example 2: any Ace except OR may be played.



Double GinNOT Meld



Example 3: an Ace of ORs cannot be played.

GinBYTE Rummy

GinBYTE allows all of the legal melds of ordinary Gin Rummy, but, in addition, any two BYTE cards may, as a pair only, be played to complete a set meld or a sequence meld. In this game the BYTE card might be considered a natural wild card since, as defined here, it is a logically neutral computer memory cell that is empty and may be used to store (or become) any desired card numerical value or suit.

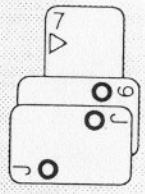
Only two BYTE cards, no more or no less, may be played to complete a meld. The BYTE suit, itself, may not be used as the meld suit.

In the set example, two BYTE cards make a meld of 7-7-7. The opponent may add natural sevens of any suit to this example of a set meld.

In the sequence example, two BYTE cards make a four card meld of 5-6-7-8. A Four of NOTs or a Nine of NOTs may be added to the example of a sequence meld, but not a Six or Seven of NOTs because the two BYTE cards satisfy this need.

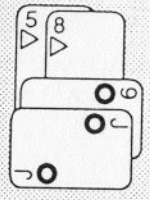
GinBYTE Set

This meld is equivalent to a set of Three Sevens of NOTs..



GinBYTE Sequence

This meld is equivalent to a sequence of Five, Six, Seven & Eight of NOTs.



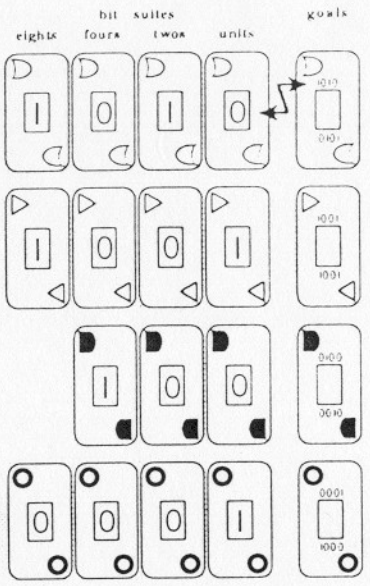
Binary Solitaire

The mathematical heart of all computers is binary arithmetic. The goal of this Solitaire game is to match a "goals" layout of four binary *numbers* with four suites of binary *bits* of the same suits. The four suites are built to match the "goals" layout in classic Solitaire tradition.

The deck consists of 40 cards, ace through ten. The court cards and jokers are removed. After shuffling the deck, make a layout of four cards, one of each suit, in a vertical column on the right side of the table. These are found by turning one card at a time from the top of the stock with suit duplicates placed immediately on the bottom of the stock. When finished, the layout reveals the four binary numbers that become the goals for the building of four bit suites. Note that only the binary numbers and suits are important in the "goals" layout.

Cards are dealt from the stock to a wastepile in sweeps of three at a time with only one redeal allowed (or none for a tougher game). The only elements of importance are the *suits* and their *bits* as shown. Cards of the proper suit and proper bit of "0" or "1" may be played only from right to left, i.e., from a binary number system's least-significant-bit column (units) to its most-significant-bit column (eights).

This example shows a successful completion of all four columns for three suit rows, i.e., the OR, NOT, and BYTE suit goals. An AND card with the binary bit of "0" was not found for the eights column of the AND suit goal.



Only relevant elements are shown.

Decimal-to-Binary Solitaire

In the science of computers, a fundamental device is a decimal-to-binary encoder. It requires four OR gates to translate the input of a ten-digit decimal number to a four-bit binary output. This Solitaire game includes these basic elements.

The Deck

The deck consists of 52 cards, plus one joker that serves as a decimal value of "0" as shown. Any ace serves as a decimal value of "1" also in the Decimal Input Row.

The Deal / The Goal

From the stock, deal a row of ten cards, face up, to form the initial Decimal Input Row. Your goal is to display the correct decimal numbers 0 through 9, regardless of suit, across these ten columns from left to right; to display the Ace, Jack, Queen and King of ORs in the OR Gate Row; and to display the four tens, i.e., a binary bit output of "0000" as shown in the Binary Output Row. The game is won when these three conditions are met regardless of how many cards are left in hand or in the wastepile.

The Play

After the deal, cards are dealt from the stock to a wastepile in sweeps of three at a time with unlimited redeals. At any time, any court card or ace of any suit exposed on the wastepile or exposed by itself in the Decimal Input Row may

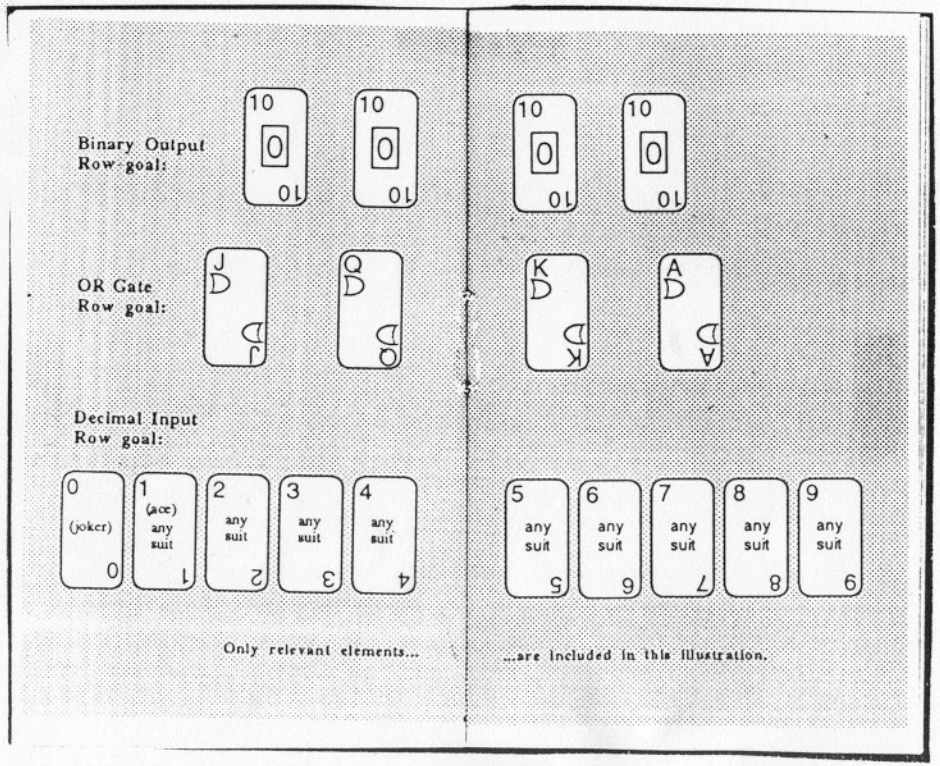
Decimal... (continued)

be played to its appropriate column in the OR Gate Row unless that OR column is finished; i.e., already topped with the actual Ace, Jack, Queen or King of ORs. Similarly, any ten from the wastepile or the OR Gate Row may be played at any time to the Binary Output Row. No play opportunity is obligatory, and good strategy may dictate inaction or delay in moving a card from row to row during a play.

Single cards in the Decimal Input Row cannot be moved to an empty column in this row, but may be moved at any time on top of other cards in ascending or descending order--with the option of reversing the order. For example, after playing a three on top of a two, you may follow with either a four or a two! Whenever a column is vacant, it must be filled immediately from the top of the stock, not from the wastepile.

Each of the four OR Gate Row columns need not have a minimum number of court cards or aces before it is finished by the play of a proper OR card. But, for example, once you choose to play a Jack of ORs, no other jacks can be played or moved. Your game would be lost if, subsequently, a jack is played from the stock to the Decimal Input Row.

(sample layout on next two pages)



Only relevant elements...

...are included in this illustration.

Binary Black Jack
alternate name: 4-BIT

Requirements: 52-card ZByte deck, no jokers, and a decimal-to-binary guide, 0 to 15.

Value of cards:

1. Only the large binary bits of "0" or "1," as printed on ace through ten, are used. The small binary numbers, the decimal numbers, and the suits are ignored during this game.

2. Face cards have no binary bit values, but may function as end-of-number or stop cards on either end as described below.

Object of game: To display four number cards that achieve with their bits the highest binary value up to, but not over, "1100."

Dealer, betting limit, and shuffle: Standard Black Jack rules are followed.

The Deal: Each player is dealt two cards face up, the second one to the player's right of the first. If one or both cards are number cards, the deal is over. If both are face cards, additional cards are dealt immediately until that player has one number card showing.

The Play: 1. The player to the dealer's left is first. As in Black Jack, you may *stay* or be *hit*. Each player requests to be hit with in-hand cards until four number cards are acquired, combining face-up and in-hand cards. If hit with face cards, which have no value, you must show them and request to be hit again until you have no more than four number cards total.

Binary... (continued)

2. If during the deal a face card was dealt face up, it blocks the bit number at its end, and no cards ever may be played to that side. The face card has no bit value of its own, and, therefore, the adjacent bit number is the highest (or lowest) possible for the player. Thus, the player will need three bit cards in hand.

3. At the conclusion of each player's final play, in-hand cards must be placed one at each end of the layout, not both on the same side, unless a face card blocks one end as described above. If during your play, you realize that the combination of face-up and face-down bits unavoidably exceeds the binary value of "1100," you must reveal immediately that you are *bust*, show all cards, and pay the dealer.

4. The dealer plays last and must draw each card face up and if it is a number card, position it immediately. If an unavoidable "1101" or higher is drawn, the dealer pays remaining players. If "1011" or less is drawn, the dealer pays only remaining players with higher numbers. For ties, no one pays.

DECIMAL-TO-BINARY GUIDE

0 = 0000	6 = 0110	12 = 1100
1 = 0001	7 = 0111	13 = 1101
2 = 0010	8 = 1000	14 = 1110
3 = 0011	9 = 1001	15 = 1111
4 = 0100	10 = 1010	
5 = 0101	11 = 1011	

StudAND Poker
DrawAND Poker

StudAND and DrawAND Poker follow the general rules of five-, six-, and seven-card Draw Poker and Stud Poker and their variants, except for the function of the AND suit. The special rules are as follows:

1. If a player has one or more AND cards with a value of one (ace) through nine, any of these may be *added* to any other card of any suit and any number to create a "single card" of the latter card's suit with a sum of their numerical values up to a maximum of ten.

EXAMPLES:

An Ace of ANDs and a Two of ORs equals a Three of ORs "card."

A Three of ANDs and a Five of ANDs equals an Eight of ANDs "card."

A Nine of ANDs and an Ace of BYTEs equals a Ten of BYTEs "card."

2. The above use of AND cards is optional, i.e., a player does not have to combine any AND cards with other cards, but may play them as regular AND cards according to traditional rules.

StudAND... (continued)

VARIANT:

1. If a player has one or more AND cards with a value of one (ace) through five, any of these may be *added* to any other card of any suit if it has the *same* numerical value to create a "single card" of the latter card's suit.

EXAMPLES:

An Ace of ANDs and an Ace of ORs equals a Two of ORs "card."

A Three of ANDs and a Three of ANDs equals a Six of ANDs "card."

A Five of ANDs and a Five of BYTEs equals a Ten of BYTEs "card."

2. The above use of AND cards is optional, i.e., a player does not have to combine any AND cards with other cards, but may play them as regular AND cards according to traditional rules.

The variant's rules are more restrictive of the power of an AND card, but are more in keeping with the logical use of AND gates in computers and control technology. In this variant, the AND card's value (which we are considering as its logical input) must be the same as that of its partner card (a second logical input of equal value) to produce a new single "card", i.e., the inputs must match in order for the logical gate to produce an output.

StudOR Poker
DrawOR Poker

StudOR and DrawOR Poker follow the general rules of five-, six-, and seven-card Draw Poker and Stud Poker and their variants, except for the function of the OR suit:

1. If a player has one or more OR cards of any numerical value, one (ace) through ten, then one--and only one--of these cards may be paired with any other card of a different suit to create two cards of the latter card's numerical value or its suit. Unlike StudAND and DrawAND Poker, the cards are not added together. Only the OR card changes: it assumes either the same number or the same suit of its paired card.

EXAMPLES:

A Two of ANDs and an Ace of ORs may be paired to equal either a Two of ANDs and a Two of ORs or a Two of ANDs and an Ace of ANDs.

A Five of NOTs and a King of ORs may be paired to equal either a Five of NOTs and a Five of ORs or a Five of NOTs and a King of NOTs.

2. The above use of OR cards is optional. A player is not required to merge OR cards to other cards in his/her hand, but may play them at face value in the traditional manner.

These rules are in keeping with the logical use of OR gates in computers and control technology. In this Poker game, the OR card's suit (which we are considering as its logical input)

StudOR... (continued)

must be different from the suit of its paired card (a second logical input of different value) to produce a new pair of cards (to allow a single logical output derived from one number or one suit from the two different inputs).

TwoBYTE Poker

TwoBYTE Poker follows the general rules of five-, six-, and seven-card Draw Poker and Stud Poker and their variants, except for how the BYTE suit is used. Since the BYTE suit may represent a memory cell in a computer that holds any numerical value or suit, the special rules are:

1. If a player has two, and only two, BYTE cards, they may be played as wild cards of one or two suits and any numerical values.

2. If a player has only one BYTE card, it must be played at face value, including its suit, in the traditional manner.

Odd/EvenBYTE Poker (VARIANT)

Before any hands are shown, a player during a turn may play a single *odd* or *even* BYTE card, two through ten, and declare the "size" of all final hands must be either odd or even for that game. Royal and straight flushes are exempt from this limit. Thus, if "even", then full house, flush, straight, and three-of-a-kind hands are illegal. If "odd", then four-of-a-kind, two-pair, and one-pair hands are illegal.

DrawNOT Poker
StudNOT Poker

StudNOT and DrawNOT Poker follow the general rules of five-, six-, and seven-card Draw Poker and Stud Poker and their variants except for the optional function of the NOT suit. The special rules are as follows:

1. If a player has one or more NOT cards, the numerical value of one, and only one, of these cards must be any numerical value that is *not* its own.

EXAMPLES:

An Ace of NOTs may be played as a Two through King of NOTs.

A Three of NOTs may be played as an Ace, Two, or Four through King of NOTs.

A Nine of NOTs may be played as an Ace through Eight of NOTs or Ten through King of NOTs.

2. The above use of one NOT card is required. The other NOT cards in a player's hand must be played at face value in the traditional manner.

Face cards

Original drawings by California artist, Roger Ferragallo, of the following great figures in the history of science:

QUEENS (in this order: AND, NOT, BYTE, OR)

MARIA GAETANA AGNESI (1718-1799) Agnesi, perhaps the first woman professor of mathematics, wrote in 1748 the oldest surviving math book by a woman.

SOPHIE GERMAIN (1776-1831) Germaine, a brilliant mathematician, wrote under the male pseudonym of LeBlanc. She is famous for her theory of numbers.

LADY ADA LOVELACE (1815-1852) Lovelace was the first computer programmer in history because of her work with Babbage's "Analytic Engine."

MARY FAIRFAX SOMERVILLE (1780-1872) Her important "Mechanisms of the Heavens" was the best text on Laplace's astronomy and math for over 100 years.

KINGS (in this order: BYTE, AND, OR, NOT)

CHARLES BABBAGE (1792-1871) The basic concepts of all modern computers are derived from Babbage's invention of his Analytic Engine, a mechanical computer programmable by punched code.

GEORGE BOOLE (1815-1864) His Boolean algebra, basic to all computers, is also basic for ZByte suits.

GOTTFRIED WILHELM LEIBNIZ (1646-1716) One of the inventors of calculus and binary math, Leibniz also attempted to reduce reasoning to a form of symbolic logic.

BLAISE PASCAL (1623-1662) Famous for his "mystic hexagon theorem," Pascal also invented a digital calculator and was one of the founders of modern probability theory.

JACKS -- JOKERS

Future robots & androids of glass and silicon, to be named