//<**DECODING BINARY**>//BINARY CODE IS THE BASIS OF ALL MODERN COMPUTER PROGRAMMING. COMPUTERS OPERATE USING ELECTRIC RELAYS, AND INFORMATION MUST BE ENTERED INTO THEM AS LONG STREAMS OF "ON" AND "OFF." BINARY CODE REPRESENTS THE "ON" AND "OFF" STATES WITH THE NUMBERS 1 AND 0. ALL NUMBERS ENTERED INTO A COMPUTER MUST BE TRANSLATED FROM NORMAL NUMBERS (CALLED DECIMAL NUMBERS) INTO A SEQUENCE OF ONES AND ZEROES. FOR EXAMPLE, FIVE BECOMES 101, AND EIGHT IS 1001. ADVANCES IN COMPUTER HARDWARE HAVE ALLOWED FOR FASTER AND MORE COMPLEX PROGRAMS, BUT ALL SOFTWARE IS BASED ON THE SAME UNDERLYING MATHEMATICAL IDEAS//01
00010010110010100010001001011001001000100 0110010010001001011001001000100101100100100010011010101010110010010000
100101100100100010010110010010001001 0110010010001001011001001000100101100100100010001001 0110010010001001011001001
0001001011001011001//**500**: THE FIRST KNOWN DESCRIPTION OF A BINARY NUMERAL SYSTEM BY PINGALA, AN ANCIENT INDIAN MATHEMATICIAN, IN A SANSKRIT BOOK ON METERS. PINGALA USES 1 AND 2 INSTEAD OF 1 AND 0// 0010110
010010001001011001001000100010010110010010001001011001001000100 0110010010001001011001001000100101100100100010
01011001001000100101100100100010010110010010001001 01100100100010010110010010001001011001001000110001010001001
01100100101100101100101000101100100100010010110010010001001011001001000100101100100100010010110010010001001011
0010010001001 0110010010001001011001001000100101100100101100100010010110010010001001011001001000100101100100100
0100101100100100011001011110//**1703**: GOTTFRIED WILHELM LEIBNIZ PUBLISHES HIS IDEAS ABOUT BINARY CODE AS A PURE FORM OF LOGIC BECAUSE IT REPRESENTS ONLY TWO OPPOSITE STATES, ON AND OFF//1011001001000100000110
10101010101010001011001001000100101100100100010010110010010001001011001001000100101100100001000100101010101100
11010101101010100010001010110101010101010100010//**1842**: ADA BYRON (LATER KNOWN AS LADY ADA LOVELACE) WRITES SEVERAL PROGRAMS FOR CHARLES BABBAGE'S DIFFERENCE ENGINE, AN EARLY DESIGN FOR A PROGRAMMABLE COMPUTER. BYRON'S INNOVATIONS INCLUDE CONCEPTS SUCH AS SUBROUTINES (SETS OF REUSABLE INSTRUCTIONS), LOOPING (REPEATING SETS OF INSTRUCTIONS OVER AND OVER AGAIN) AND CONDITIONAL JUMPS (BRANCHING TO SPECIFIED INSTRUCTIONS IF A PARTICULAR CONDITION IS SATISFIED). ADA LOVELACE IS RECOGNIZED TODAY AS THE WORLD'S FIRST COMPUTER PROGRAMMER//00010010110010010001001011001001000100101100100100010010110010010001001100100 1100
100010010110010010001001011001001000100 01100100100010010110010010001001011001001000100100100100100110110010
01000100101100100100010010110010010001001 0110010010010101010101010101010101010101010101010101101010100101101010
1010//**1847**: GEORGE BOOLE INVENTS BOOLEAN ALGEBRA, A BRANCH OF MATHEMATICS DEALING WITH LOGIC. ACCORDING TO THE BOOLEAN SYSTEM, LOGIC OPERATIONS CAN BE REDUCED TO THREE STEPS: UNION (OR), INTERSECTION (AND), AND COMPLEMENTATION (NOT). BOOLEAN ALGEBRA WOULD BECOME THE BASIS OF ALL COMPUTER SCIENCE IN THE TWENTIETH CENTURY// 001010010100100010010110010010001001011001001000100 0110010010001001011001001000100 10010
1100100100010010110010010001000100100010010101011001001000100101100100100010001001 0110010010001001011001001000100 1
0110010101001010001001010010100100110011000100010//**1874**: EMILE BAUDOT INVENTS THE FIRST BINARY CODE SYSTEM FOR TRANSMITTING DATA. INSPIRED BY MORSE CODE, BAUDOT'S MACHINE REPRESENTS EVERY LETTER OR NUMBER AS A SPECIAL CODE MADE OF FIVE UNITS, INCLUDING DOTS AND THE LETTER X//1001010010100101001010010100100001001
010010100101001010010100101001010010100100010010001001011001001000100101100100100010010110010011001011001001000
100101100100100010010110001001000100101100100100010010110010010001001000101010101010100000100000101000010101 0
101001//**1937**: ALAN TURING PUBLISHES PAPER "ON COMPUTABLE NUMBERS," WHICH SHOWS THAT IT IS POSSIBLE TO SOLVE ALL MATHEMATICAL PROBLEMS WITH A SERIES OF SMALL STEPS IN LOGIC. HE DESCRIBES MACHINES RESEMBLING MODERN COMPUTERS, WHICH READ INFORMATION FROM A SERIES OF 1'S AND 0'S, THEN REACH THE CORRECT RESULT BY FOLLOWING A SERIES OF STEPS IN THE PROPER ORDER//101000100001001000010001000011100101000001001
100010010110010010001001011010100010111101010010011000101000010000101111010101010101010110100001010010101000010
1110011101010101010000101//**1938**: KONRAD ZUSE BUILDS THE Z1 COMPUTER, FIRST OF HIS Z SERIES. THE Z1 IS THE FIRST COMPUTER TO USE BINARY CODE. THE COMPUTER CONVERTED DECIMAL NUMBERS INTO BINARY CODE, THEN USED A PROGRAM STORED ON PUNCHED TAPE TO MAKE THE CALCULATIONS. AN OUTPUT DEVICE SHOWED THE RESULTS IN DECIMAL FORM. ALL OF THE COMPUTER'S FUNCTIONS WERE MAINTAINED BY ONE ELECTRIC MOTOR//001000100101
1001001000100101100100100100100010010110010010001001011001001000100101100100100010010110011000100101100100100
010101001011001001000100101//**1945**: JOHN VON NEUMANN, PROFESSOR OF MATHEMATICS AT PRINCETON UNIVERSITY, PUBLISHES A REPORT SETTING OUT THE PRINCIPLES OF MODERN COMPUTING, ONE OF WHICH IS THE USE OF BINARY CODE//0010010001001011001001000100101100100100010010110010010001001011001001000100101100100100010010110
0100100010010110010010001001011001001000100101010100110010001001000100101100100100100010010110010010001001011
0010010001001011001001000100101100100100000100100010010110010010010110010110010010001001011001001000100101100
1001000100101100101010101000010001//**1952**: GRACE HOPPER CREATES THE A-O SYSTEM FOR THE UNIVAC COMPUTER, THE FIRST COMPILER FOR A PROGRAMMING LANGUAGE. A COMPILER IS A PROGRAM THAT TRANSLATES ENGLISH LANGUAGE INSTRUCTIONS INTO BINARY CODE. INCORPORATING HUMAN LANGUAGE INTO COMPUTER PROGRAMMING ALLOWED PEOPLE TO WRITE CODE FASTER AND WITH LESS ERRORS//001001000100101100100100010010110010010001001011001001
0001001011001001000100101100100100010010110010010001001011010001010010101010101010101010101101010100110101001
01010101010010100101010101001000//**1954**: FORTRAN, THE FIRST SUCCESSFUL HIGH-LEVEL PROGRAMMING LANGUAGE, BECOMES COMMERCIALLY AVAILABLE. FORTRAN WAS DEVELOPED FOR IBM BY JOHN BACKUS. BECAUSE FORTRAN USED A COMPILER, PROGRAMMING IN THIS LANGUAGE WAS FASTER AND MORE EFFICIENT//01001000100101100100100010010110
0100100010010110010010001001011001001000100101100100100010010110010010001001010101001001001000100101101010101010
100010001001011001001000100101100100100010010110010010001001011001010101101010011111111000000000000000000000001
011110000000000//**1964**: JOHN KEMENY AND THOMAS KURTZ, EDUCATORS AT DARTMOUTH COLLEGE, INVENT THE BASIC PROGRAMMING LANGUAGE. BASIC WAS THE FIRST HIGHER-LEVEL PROGRAMMING LANGUAGE DESIGNED TO BE EASY TO LEARN AND USE. UNLIKE FORTRAN, BASIC WAS MEANT FOR NON-PROFESSIONALS. PROGRAMMERS STILL USE BASIC TODAY//010010001001011001001000100101100100101011001001000100101100100100010010110010010001001010100100010010110
01001000100101100100100010010101110010010001001011001001000100101100100110101010101010100101001010100110101010
1001101010//**1964**: DOUGLAS ENGELBART INVENTS ONSCREEN WINDOWS, FRAMED WORK AREAS THAT CAN APPEAR ON THE SCREEN AT THE SAME TIME WITH EACH OTHER. USERS CAN DO MORE THAN ONE TASK AT A TIME BY MOVING FROM ONE WINDOW TO ANOTHER. ENGELBART ALSO CREATED THE MOUSE TO NAVIGATE AMONG THE SCREEN WINDOWS WITH//010010
0010010110010010001001011001001000100101100100100010010110010010001001101100100100010010110010010001001011001 01
0101010100101010101010101010101010101011010101010101011010101010101010101011001101010101010101010101011010101010 0
01010100//**1975**: PAUL ALLEN AND BILL GATES WRITE THE FIRST COMPUTER LANGUAGE FOR PERSONAL COMPUTERS,(A FORM OF BASIC). GATES AND ALLEN WILL LATER FOUND MICROSOFT//0001001011101010001000100100011001000100 10110
0100100010010110010010001001011001001000100101100100100010100100010010110010010001001011001001000100101100110 11
0010001000100101101010101010010010001001011001001000110101010//**1984**: IBM BEGINS MARKETING THE FIRST PERSONAL COMPUTER. THE PROGRAMS ARE RUN WITH DOS (DISK OPERATING SYSTEM), DESIGNED BY MICROSOFT. THE OPERATING SYSTEM IS A SET OF INSTRUCTIONS RUNNING THE COMPUTER, AND IS USED TO ACCESS THE COMPUTER'S PROGRAMS. WITH THE FIRST PC, COMPUTERS FINALLY BECOME ACCESSIBLE TO THE AVERAGE PERSON. MICROSOFT, ALONG WITH OTHER COMPANIES, WILL CONTINUE TO WRITE NEWER, MORE REFINED OPERATING SYSTEMS//010110010010001001011001
0010001001011001001000100101100100100010010110010010001001011001001000100101100100100010010100100010010110010 01
0001001011001001000100101100100100010010110010010001001011001001000100101100100100010001001011001001000100101 10
0100100010001100100100010010110010010001001011001001000100101100100100010010110010010001001011001001000100101 10
0100100010010110010010001001011001001000100101000100101100100100010010110010010001000110010010001001011001001 00
0100101100100100010010110010010001001011001001000100101100100100010011100100100010010110010010001001011001001 00
0100101000100101100100100010010110010010001001100100100010010110010010001001011001001000100101100100100010010 11