Mark:

8. BCOND = 4'b1100,

BCOND or Branch Condition is used after a Compare(cmp) operation. BCOND is interpreted as an I-type instruction with op code 4’b1100. The destination register, Rd, is not used by the branch operation so its value is listed as an ‘x’. The value of the source register, Rs, should be replaced with the value of the branch condition. The immediate value is used as an offset from the current PC value plus 1. When BCOND is executed, if the condition is satisfied inside of the PSR, the value of the immediate plus 1 is added to the PC. Otherwise, if the branch condition is not met then the PC continues to the next value as normal. The operation is used inside of loops and conditional statements.

9. LOAD  = 4'b0111,

LOAD is an I-type instruction with an op code of 4’b0111. This instruction loads the data from address in RAM into the destination register, Rd. The address is the value of the source register, Rs, plus the value of the immediate as an offset.

10. STR   = 4'b1010;

STR is an I-type instruction with an op code of 4’b1010. This instruction stores the data from a register specified by the destination register, Rd, into RAM. The address where the data is stored comes from the addition of the data from the source register, Rs, and the immediate value as an offset.

11. J     = 4'b1101,

J or Jump has an op code 4’b1101 followed by a 28 bit immediate value. The value of the program counter is changed to the value of the immediate so that the next instruction comes from that address.

12. JAL   = 4'b1111,

JAL or Jump and Link has an op code 4’b1111 followed by a 28 bit immediate value. The value of the PC is changed to value of the immediate so that the next instruction comes from that address. In addition, the value of the current PC plus one is saved into the Return Address register, RA.

13. JRA   = 4'b0110;

JRA or Jump to Return Address has an op code of 4’b0110 followed by a 28 unused bits. When this instruction is executed the value of the PC is set equal to the value contained by the Return Address register, RA.

14. SCOND = 4'b0100;

SCOND or Set on Condition has an op code of 4’b0100 and a function code 4’b1101. This instruction is used following a Compare instruction, CMP. The value of the destination register, Rd, is set to a binary 1 if the condition is true. Otherwise Rd is set to 0. The condition value replaces the value of the source register, Rs.