Name	Fields						Comments
Field size	6 bits	5 bits	5 bits	5 bits	5 bits	6 bits	All MIPS instructions are 32 bits long
R-format	op	rs	rt	rd	`shamt`	funct	Arithmetic instruction format
I-format	op	rs	rt	address/immediate			Transfer, branch, `imm`. format
J-format	op	target address					Jump instruction format

FIGURE 2.20   MIPS instruction formats.

Figure 2.20 shows all the MIPS instruction formats. Figure 2.1 on page 78 shows the MIPS assembly language revealed in this chapter. The remaining hidden portion of MIPS instructions deals mainly with arithmetic and real numbers, which are covered in the next chapter.

Check Yourself

I. What is the range of addresses for conditional branches in MIPS (K = 1024)?

  1. Addresses between 0 and 64K   1
  2. Addresses between 0 and 256K   1
  3. Addresses up to about 32K before the branch to about 32K after
  4. Addresses up to about 128K before the branch to about 128K after

II. What is the range of addresses for jump and jump and link in MIPS (M = 1024K)?

  1. Addresses between 0 and 64M   1
  2. Addresses between 0 and 256M   1
  3. Addresses up to about 32M before the branch to about 32M after
  4. Addresses up to about 128M before the branch to about 128M after
  5. Anywhere within a block of 64M addresses where the PC supplies the upper 6 bits
  6. Anywhere within a block of 256M addresses where the PC supplies the upper 4 bits

III. What is the MIPS assembly language instruction corresponding to the machine instruction with the value 0000 0000$_{hex}$?

  1. `j`
  2. `R-format`
  3. `addi`
  4. `sll`
  5. `mfc0`
  6. Undefined opcode: there is no legal instruction that corresponds to 0