COMP2611: Computer Organization

MIPS branch and jump instructions

MIPS branch and jump instructions

MIPS branch and jump instructions - exercises

Exercises

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Question 1: Write down the MIPS instructions for the following C++ codes, assuming each variable is stored in a different register (you name it). You can use some registers for storing temporary values.

```
if (d < 4) {
  if (d == 1)
      d = d + 4;
  else ++d;
}
```

Question 2: Write down the MIPS instructions for the following C++ codes, assuming each variable is stored in a different register (you name it). You can use some registers for storing temporary values.

```
switch (d) {
  case 1: d = d + 4;
          break;
  case 4: d = d * 2;
          break;
  default: d--;
}
```

Question 3: Write down the MIPS instructions for the following C++ codes, assuming the base address of the array `A` of int elements is stored in the register `$s1` and each variable is stored in a different register (you name it). You can use some registers for storing temporary values.

```
c = 10;
while (c >= 10 && c <= 20)
{
    if (c < 15)
     A[c - 4] = A[c + 3] - c;
    c++;
}
```

Question 4: Write down the MIPS instructions for the following C++ code, assume the base address of an `int` array `A` is stored in the register `$s1` and each variable is stored in a different register (you name it). You can use some registers for storing temporary values.

```
c = 0;
do {
     c = c + 2;
     A[c - 1] = A[c];
} while (c < 10);
```

Exercises

Question 5: Write down the MIPS instructions for the following C++ code, assume the base address of an int array `A` is stored in the register `$s1` and each variable is stored in a different register (you name it). You can use some registers for storing temporary values.

```
for (int c = 0; c <= 10; c += 2)
{
    A[c] = A[c + 3];
}
```

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Exercise 1: Write down MIPS instructions for the following C++ statements. Assume the variables `i, j, x,` and `y` are stored in the registers `$t0, $t1, $a1,` and `$a2`.

```
int i = 0;
int j = -1;
while ( i < 10) {
    if ((i & 0x0001) == 1)
        j+=i;
    i++;
}
```

Exercises

Exercise 2: Write down the MIPS instructions to find the Maximum in an int array, assume the base address of the array `A` is stored in the register `$s1` and the size of the array is stored in the register `$s2`. You can use some registers for storing temporary values.

Exercise 3: Write down the MIPS instructions for the following C++ code, assume the variable d of type char is stored in the register `$s0`. You can use some registers for storing temporary values.

```
switch (d) {
  case 'A': d = d / 2;
            break;
  case '?': d = d - d;
}
```

Exercises

Exercise 4: Convert the following MIPS code into the corresponding C++ statements.

MIPS code:

```
        add $t0, $zero, $zero    #$t0 stores  the variable i
        addi $t2, $zero, 1       #$t2 stores the variable j
        addi $s0, $zero, 5
Loop:
        slt $t1, $t0, $s0
        beq $t1, $zero, Done
        addi $t2, $t2, 3
        addi $t3, $zero, 8
        bgt $t2, $t3, Done
        addi $t0, $t0, 1
        j Loop
Done:
```