Program 1:

Inputs:

This program took in three inputs. Each a positive decimal integer. These were collected from the user with a prompt through the console.

Outputs:

The sole output of this program is a decimal integer, which was the maximum of the three input numbers.

Design:

I used three prompts to collect the integers from the user and store them in registers. I then used a function that would take three numbers and return a 1 if the first number was bigger than the other two numbers. I passed the three input numbers into this function and if one was returned then I would jump to a subroutine that would print the first number. If a zero was returned then I would change the order, and see if the second number was bigger than the other two numbers, if this returned a one, I would jump to a routine that would print the second number. Finally if this returned a zero, then I would print the third number and end the program.

Symbol Table:

s0	Stores the value of the first input
s1	Stores the value of the second input
s2	Stores the value of the third input
t0	Temporary value for the comparison function.
t1	Temporary value for the comparison function.
t2	Temporary value for the comparison function.
v0	Argument for syscall
a0	Argument for syscall

Program 2:

Inputs:

This program takes two inputs. Both floating point decimals numbers. They represent height in inches and weight in pounds.

Outputs:

This program will return the BMI calculated with a formula and the status of your BMI based on that calculation.

Design:

I load the floating point number into the .data section of the program as well as the messages for each category as newline terminated ascii values. I then load them in the main program. Next, I apply all the calculations necessary to get the final BMI number. I then check to see if this number is less than the number for underweight, if so, I jump to the subroutine that prints out underweight and end the program. Next I check if it's less than the number for normal weight, if this is true, then I jump to the subroutine that prints normal weight and ends the program. Finally if neither of these checks hold, I print overweight and end the program.

Symbol Table:

f2	Weight in lbs
f4	Height in inches
f6	Temporary calculation step
f10	Multiplicative constant for calculation
f8	Final BMI
v0	Argument for syscall
a0	Argument for syscall

Program 3:

Inputs:

This program takes four inputs. Number of homeworks, the average time per homework, number of exercises, and the average time per exercise. Each is prompted from the user in the console.

Outputs:

The only output from this program is the total number of hours of work.

Design:

First I prompt the user for all of the required inputs of the program. These get stored into registers $s0 through $s3. Then I have a function that multiplies the values in the registers t0 and t1 and puts in t2. The total function puts the correct values into this function and stores the result as a temporary value for both homeworks and exercises. It then adds these values together and returns that as a total number of hours. Finally the program will print this number and end.

Symbol Table:

a0	Syscall Argument
v0	Syscall Argument
s0	Input Value
s1	Input Value
s2	Input Value
s3	Input Value
t0	Multiplication function argument
t1	Multiplication function argument
t2	Multiplication function result
t4	Held the value of $ra from the total function so a subroutine could be called
t5	Temporary math register
t6	Temporary math register

Learning Coverage:

1. I learned about functions and subroutines and how to label them.
2. I learned about the different types of jumps (Jal, j, blt, beq, etc...)
3. I learned about floating point number storage
4. I learned about floating point number operations and how they are different from regular word operations.
5. I learned about non-leaf functions and how to call them and store the PC for later use.

Test Results:

```
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$ spim -file c1.s
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
Enter a number
5
Enter a number
7
Enter a number
2
7
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$ spim -file c1.s
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
All Rights Reserved.
See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
Enter a number
100
Enter a number
25
Enter a number
17
100
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$
```

```
(spim) exit
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$ spim -file c2.s
SPIM Version 8.0 of January 8, 2010
Copyright 1990-2010, James R. Larus.
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Loaded: /usr/lib/spim/exceptions.s
Overweight
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$ spim -file c2.s
SPIM Version 8.0 of January 8, 2010
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Loaded: /usr/lib/spim/exceptions.s
Underweight
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$
```

```
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$ spim -file program3
.s
SPIM Version 8.0 of January 8, 2010
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See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
Enter number of homeworks
5
avg HW hrs
3
Enter number of exersises
1
avg HW hrs
2
17 Total Hours
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$ spim -file program3
.s
SPIM Version 8.0 of January 8, 2010
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See the file README for a full copyright notice.
Loaded: /usr/lib/spim/exceptions.s
Enter number of homeworks
4
avg HW hrs
1
Enter number of exersises
2
avg HW hrs
2
8 Total Hours
kpspell@DESKTOP-J5BH3R7:/mnt/d/Working Directory/School/CSCE212/212_Projects/p3$
```