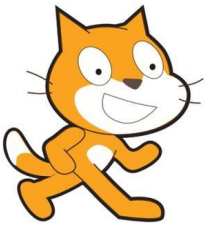

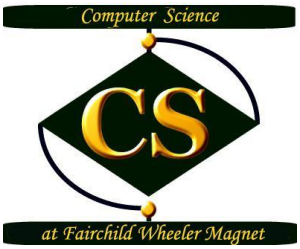

Random Numbers and Probability

a. Write a program that will have Scratch pick 10 random numbers between 1 and 100 (Operator - > pick a random number 1 to 100) and then say the number for 3 seconds. Use a loop that goes 10 times.

Pseudocode:
Create a variable called num
Set num to Operators - > Pick a random number 1 to 100
Say num for 3 seconds
Put the above in a loop that goes 10 times

b. Write a program that will have Scratch flip a coin one hundred times (pick a 1 or a 2 as a random number Operator - > pick a random number 1 to 100) . Get a picture of a heads and tails and upload it as a Sprite and the other as a costume (go to Costume and then upload the heads picture and then the tails picture).

Make Scratch the main sprite (highlight him and write the code for him). Generate a random number, either 1 or 2. If it is 1 then change costume to the Heads costume, if it is 2 then change costume to the Tails costume.

At the end print out how many heads and tails there were.

Pseudocode

Get a coin sprite with a heads and tails costumes
Make variables num, heads, tails
Set heads and tails to 0
Set num to a random number 1 or 2
If its 1 have coin change costume to heads, say Heads and change heads by 1
If its 2 have coin change costume to tails, say Tails and change tails by 1
Wait 3 seconds
When loop is over says how many heads and tails there were (use join)

Sample Program

c. Simulate the rolling of a die 100 times. Print out the number on the dice (The dice would each have 6 costumes). How many times did the total of 3 come out?

Pseudo Code

1. Create two variables - dice1 and ct
2. Get a loop to go 100 times (Control -> repeat 100)
3. Put dice sprite on screen
4. Set dice to a random number between 1 and 6 (Data -> set dice1 to Operators -> pick random 1 to 6)
5. If dice1 = 1 then broadcast to change to Dice1 costume, if dice1 = 2 then broadcast change to dice 2 costume (do the same for the other 4 numbers)
6. If the sum equals 3 then make a ct variable go up by 1 (if ct = 3 change sum by 1)
7. When loop is over say the 3 came out ct times

d. Have Scratch pick 100 random numbers between 1 and 100 and then print out the sum and the average of the 100 numbers (use a loop up to 100). Hint : to get the sum create a sum variable and then use the command Data - > Change sum by Operators -> pick random 1 to 100 . When the loop is over have Scratch say what is in the sum box and for the average say the sum / 100

Pseudocode

1. Create 3 variable num, sum and avg
2. Set sum to 0
3. Get a loop to go 500 times
4. Set num to a random number between 1 and 100 (Data -> set num to Operators -> pick random 1 to 100)
5. Change sum go up by num
6. When loop is over have Scratch say sum / 500

e. Write a program that will simulate a fortune teller. You can upload a picture of him/her. When you run the program 1 of 5 different fortunes will come out (get a random number between 1 and 5. If the number is 1 say something, if the number is 2 say something else etc.). Make the fortunes appropriate.

Pseudocode

1. Create a variable num
2. Set num to a random number 1 to 5
3. If num = 1 then say a fortune
4. if num = 2 then say a different fortune
5. Complete for numbers 3 - 5

f. Write a program that will print out an addition problem with random number. They will tell the person using the program if they got the question right or wrong.

Pseudocode

1. Create 4 variables -> n1, n2, sum and ans. Set n1 and n2 to random numbers between 1 and 25. Set the sum to n1 + n2.
2. Print out the problem (it will be like 12 + 23 =) for 10 seconds
3. Then get an answer from the keyboard (ask and then set ans to answer)
5. If ans = sum tell them they got it right else tell them they were wrong.
6. Once you get it working wrap it all in a loop and do it 10 times
7. For extra credit give them a score when they are done

Sample Program

g. Extra for Experts

Write a program that will pick a number between 1 and 100 and then let you guess the number. It will tell you that you got it (and end program) or tell you your guess was too high or too low and let you continue guessing. At the end it should tell you how many guess it took.

Pseudocode
1. Have the computer pick a number between 1 and 100
2. Guess the number
3. Make ct get 1 bigger
4. Repeat until the your number = the computer number
5. Say the ct