

Selected Answers from Midterm II

#7: Simulation of tossing two coins with the enhancement of counting the number of times both coins were heads:

```
when clicked
  set number-of-heads-and-heads to 0
  set coin1-heads to 0
  set coin1-tails to 0
  set coin2-heads to 0
  set coin2-tails to 0
  repeat 100
    set toss to pick random 1 to 2
    if toss = 1
      change coin1-heads by 1
    else
      change coin1-tails by 1
    set toss2 to pick random 1 to 2
    if toss2 = 1
      change coin2-heads by 1
    else
      change coin2-tails by 1
    if toss = 1 and toss2 = 1
      change number-of-heads-and-heads by 1
  say join Number of times two heads were thrown number-of-heads-and-heads
```

The code is a Scratch script that starts with a 'when clicked' event. It initializes five variables: 'number-of-heads-and-heads', 'coin1-heads', 'coin1-tails', 'coin2-heads', and 'coin2-tails', all set to 0. A 'repeat' loop runs 100 times. Inside the loop, it picks a random number (1 or 2) for 'toss'. If 'toss' is 1, it increments 'coin1-heads' by 1; otherwise, it increments 'coin1-tails' by 1. It then picks another random number for 'toss2'. If 'toss2' is 1, it increments 'coin2-heads' by 1; otherwise, it increments 'coin2-tails' by 1. Finally, it checks if both 'toss' and 'toss2' are 1. If so, it increments 'number-of-heads-and-heads' by 1. After the loop, it says 'Number of times two heads were thrown' followed by the value of 'number-of-heads-and-heads'.

#8:

Total Distance:

72miles @ 65MPH + 90minutes @ 40MPH
= 72 miles + 90 mins @ 40 MPH
= 72 miles + 1.5 hours @ 40 MPH
= 72 miles + 60 miles
= 132 miles

Time required:

72 miles @ 65 MPH + 90 minutes
= 72/65 + 90/60
~ 1.108 hours + 1.500 hours
~ 2.51 hours = (about) 2 hours 36.6 minutes

Gasoline Consumed:

72 miles @ 25 MPG + 60 miles @ 30 MPG
= 72 miles / 25 MPG + 60 miles @ 30 MPG
= 2.88 Gallons of fuel + 2 Gallons
= 4.88 Gallons of fuel