06. Quiz

Linear Regression

- 최소제곱법(Method of Least Square)
 - LSM(Least Squares Method)
 - 최소제곱회귀방정식

Slope = CorrCoef ×
$$\frac{SD_y}{SD_x} = \frac{\sum (x - \overline{x})(y - \overline{y})}{\sum (x - \overline{x})^2}$$

$$Intercept = \overline{y} - (slope \cdot \overline{x})$$

Quiz [1-1]

Example

- 최소제곱회귀방정식

•
$$\hat{y} = 31.590 + 0.377x$$

_		
	시비량(x)	수확량(y)
	30	43
	40	45
	50	54
	60	53
	70	56
	80	63

시비량(x)	수확량(y)	x^2	y^2	ху		x-Mean(x)	y-Mean(y)	prod	$(x-Mean(x))^2$
30	43	900	1849	1290		-25	-9.333333	233.33333	625
40	45	1600	2025	1800		-15	-7.333333	110	225
50	54	2500	2916	2700		-5	1.6666667	-8.333333	25
60	53	3600	2809	3180		5	0.6666667	3.3333333	25
70	56	4900	3136	3920		15	3.6666667	55	225
80	63	6400	3969	5040		25	10.666667	266.66667	625
					sum			660	1750
Mean(x)	55				slope			0.3771429	
Mean(y)	52.333333								
SD(x)	17.078251								
SD(y)	6.724747								
Corr	0.9577967								
Slope	0.3771429								
Intercept	31.590476								

Quiz [1-2]

Declaration and Prototypes

```
#ifndef DATATYPE
#define DATATYPE
#define SCANFORMAT "%f"
#define PRNFORMAT "%7.3f"
typedef float EType;
#endif
#ifndef MULTIVRAIATE
#define MULTIVRAIATE
typedef struct
  int rows;
  int cols;
  char **headers;
  int length;
  EType **elem;
} MultiVariateSet;
#endif
```

Ouiz [1-3]

Declaration and Prototypes

```
static MultiVariateSet *CreateMultiVariateSet(const char *filename);
static void DestroyMultiVariateSet(MultiVariateSet *variateSet);
static void PrintMultiVariateSet(MultiVariateSet *variateSet);
static float ComputeCovariance(MultiVariateSet *variateSet);
static float ComputeCorrelation(MultiVariateSet *variateSet);
```

Ouiz [1-4]

Main

```
int main(int argc, char *argv[])
  MultiVariateSet *setVariate = NULL;
  setVariate = CreateMultiVariateSet(PATH_FILE);
  PrintMultiVariateSet(setVariate);
  printf("₩n");
  printf("Covariance = %6.3f\n", ComputeCovariance(setVariate));
  printf("Correlation = %6.3f\mathbb{\psi}n", ComputeCorrelation(setVariate));
  printf("₩n");
  DestroyMultiVariateSet(setVariate);
  return 0;
```