Additional Information ICTAI 2018

1 Metrics and Objective Functions

The objective function COE evaluates the cohesion of PLA design in terms of internal relationship of the classes of the PLA design measured by the metric H (Equation 1). ACLASS measures class coupling by the number of architectural elements that depend on other classes of the design ($CDepIn$), added to the elements number in which each class depends ($CDepOut$) according to Equation 2. For Equations 1 and 2, c is the number of classes.

FM provides indicator about feature modularization by the sum of feature scattering ($CDAC, CDAO, CDAI$), feature interlacing ($CIBC, IIBC, OOBC$) and feature-driven cohesion (LCC) metrics [1]. It evaluates the feature modularization of the PLA design, being formed by metrics driven to SPL features [2] according to Equation 3, where given a PLA design pla, c is the number of components and f is the number of features of pla.

$$COE(pla) = \sum_{i=1}^{c} H \tag{1}$$

$$ACLASS(pla) = \sum_{i=1}^{c} CDepIn + \sum_{i=1}^{c} CDepOut \tag{2}$$

$$FM(pla) = \sum_{i=1}^{c} LCC + \sum_{i=1}^{f} CDAC + \sum_{i=1}^{f} CDAI + \sum_{i=1}^{f} CDAO + \sum_{i=1}^{f} CIBC + \sum_{i=1}^{f} IIBC + \sum_{i=1}^{f} OOBC \tag{3}$$

2 PLAs Informations

The four PLA designs used in this study are briefly described below. Arcade Game Maker (AGM) is a SPL that includes three arcade games: Brickles, Bowling and Pong, developed by SEI [3]. Banking System (BANK) [4] is a SPL created to manage banking systems. Mobile Media (MOM) was designed for media control on mobile devices [5]. And, the real SPL Electronic Tickets in Urban Transportation (BET) [6] was developed to manage urban transport. Information regarding the PLA designs is presented in Table 1.

Table 1: PLA design architectural elements number

PLAS	#Components	#Interfaces	#Classes	#Mandatory Features	#Variables Features
AGM	9	14	30	6	5
BANK	4	5	25	13	3
MOM	8	15	14	7	7
BET	56	30	115	8	10

References

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